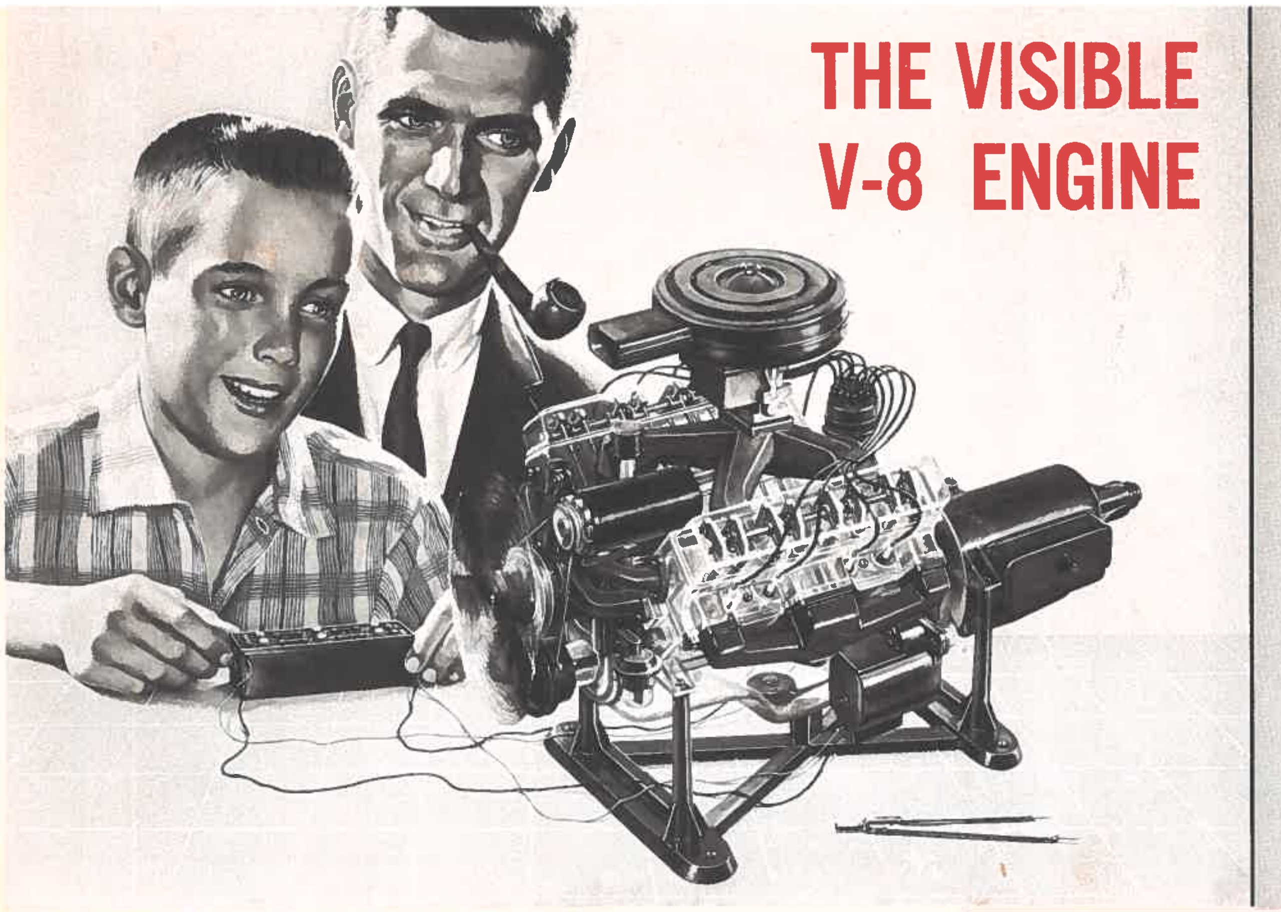


THE VISIBLE V-8 ENGINE

TWO SIZE "C" BATTERIES ARE REQUIRED

The electrical power for the Visible V-8 is supplied by two size "C" flashlight batteries. It is advisable to have these batteries on hand when assembly is started, in order to complete the tests indicated at various stages during assembly. The usual flashlight battery can be purchased for 20 cents or less.

RENWAL BLUEPRINT MODELS
BUILD THE FINEST

WARNING – PLEASE READ

You will be rewarded with a beautiful working model of the V-8 Engine

only if

you observe the following precautions:

DO NOT HURRY

Care, deliberation, patience **are required in every assembly procedure or your model will not operate.**

OBSERVE THESE RULES

- **Read and fully understand instructions for each step before proceeding with assembly.**
- **Wipe transparent parts clean of fingerprints.**
- **Check fit of all parts before cementing.**
- **Apply cement *sparingly* with care.**
- **Trim flash and excess plastic where necessary.**
- **Keep fingers clean of cement.**
- **Do not force any assembly. Parts will fit if properly identified and positioned.**

exclusive!

"NO-SHOW" CEMENT TECHNIQUE

NO-SHOW CEMENTING is designed into your kit. The parts have been specifically engineered to enable you to complete a model which is free of burns and smears. The instructions and drawings have also been designed to carry out the "NO-SHOW" cementing feature, through the use of blue tones to indicate cementing areas. These design features will enable you to obtain favorable results and reward you with a model you will be proud to display.

1. First, locate and fit pieces together, prior to cementing.
2. Then, APPLY CEMENT SPARINGLY ONLY TO THE AREAS INDICATED IN BLUE ON THE INSTRUCTION DRAWINGS. Hold or clamp parts until a permanent bond is assured.

LEGEND

🟦—Cementing area.
▥—Special "No-Show" Cementing Points. Apply cement to this area after parts are in assembled position.
▩—Hidden cementing areas.

PARTS LIST

CLEAR PARTS

1 MAIN BLOCK FRAME
2 CAMSHAFT SUPPORT (3)
3 FRONT FRAME
4 REAR FRAME
5 TIMING GEAR COVER
6 DISTRIBUTOR SUPPORT
7 LEFT CYLINDER BLOCK
8 RIGHT CYLINDER BLOCK BOTTOM
9 LEFT CYLINDER BLOCK WALL
10 RIGHT CYLINDER BLOCK
11 LEFT CYLINDER BLOCK BOTTOM
12 RIGHT CYLINDER BLOCK WALL
13 BELL HOUSING
14 OIL PAN
15 BLOCK COVER
16 RIGHT CYLINDER HEAD
17 LEFT CYLINDER HEAD
18 CYLINDER HEAD BOTTOM (2)
19 ROCKER SPACER SLEEVES (6)
20 VALVE COVER (2)
21 FUEL BOWL

RED PARTS

22 BELL HOUSING LOCK RING
23 TRANSMISSION TOP
24 TRANSMISSION BOTTOM
25 OIL FILTER CAN
26 EXHAUST MANIFOLD TOP (2)
27L EXHAUST MANIFOLD BOTTOM
27R EXHAUST MANIFOLD BOTTOM
28 INTAKE MANIFOLD TOP
29 INTAKE MANIFOLD BOTTOM
30 WATER PUMP FRONT
31 WATER PUMP REAR
32 THERMOSTAT HOUSING
33 GENERATOR BRACKET
34 GENERATOR TENSION ROD

METALLIC PARTS

36 SCREEN
37 DISTRIBUTOR SHAFT
38 DISTRIBUTOR GEAR
39 OIL STICK
40 CAMSHAFT
41 CAMSHAFT BEVEL GEAR
42 CAMSHAFT RETAINER
43 CAMSHAFT TIMING GEAR
44 FLYWHEEL PINION GEAR
45 GEAR A
46 GEAR B
47 GEAR C
47A MOTOR PINION
48 THERMOSTAT
49 GENERATOR FAN
50 GENERATOR PULLEY RING
51 GENERATOR FAN SHAFT
52 CARBURETOR FRONT
53 CARBURETOR REAR
54 CRANKSHAFT TIMING GEAR
55 CRANKSHAFT SEGMENT A
56 " " B
57 " " C
58 " " D
59 " " E
60 " " F
61 " " G
62 " " H
63 END MAIN BEARINGS (2)
64 CENTER MAIN BEARINGS (3)
65 CONNECTING RODS (8)
66 WRIST PINS (8)
67 PISTON MALE HALF (8)
68 PISTON FEMALE HALF (8)
69 ROCKER ARMS (16)
70 ROCKER SHAFTS (2)
71 ROCKER SHAFT RETAINER (2)
72 VALVE STEMS (16)
73 INTAKE VALVES (8)
74 EXHAUST VALVES (8)
75 PUSH RODS (16)
76 DRAIN PLUG

BLACK PARTS

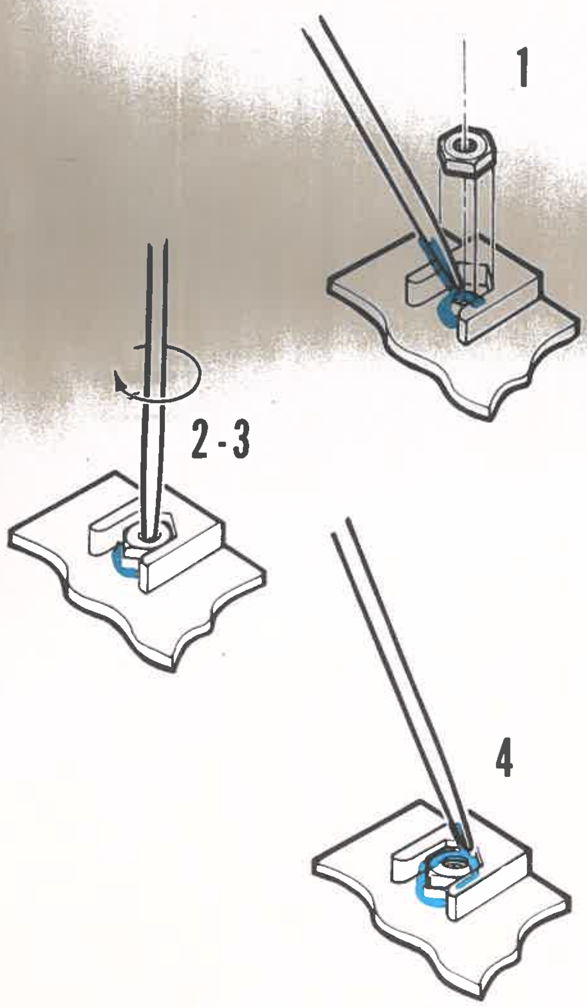
77 OIL PUMP TOP
78 OIL PUMP BOTTOM
79 SCREEN HOUSING
80 DISTRIBUTOR TOP
81 DISTRIBUTOR BOTTOM
82 ROTOR TOP
83 ROTOR BOTTOM
84 DISTRIBUTOR LOCK WASHER
85 OIL STICK SLEEVE
86 FUEL PUMP FRONT
87 FUEL PUMP ROCKER ARM
88 FUEL PUMP REAR
89 OIL FILTER HALF
90 OIL FILTER HALF
91 GEAR BOX CASE
92 GEAR BOX COVER
93 MOTOR HOUSING
94 OIL FILLER PIPE
95 OIL FILLER CAP
96 BATTERY CASE
97 BATTERY CASE TOP
98 BATTERY SWITCH PLATE
99 BATTERY SWITCH BUTTON (2)
100 IMPELLER
101 REAR FAN BLADE
102 FRONT FAN BLADE
103 FAN RETAINER
104 FAN PULLEY
105 FAN PULLEY RING
106 VIBRATION DAMPER
107 VIBRATION DAMPER PULLEY
108 VIBRATION DAMPER RETAINER
109 COIL TOP
110 COIL BOTTOM
111 GENERATOR CASE
112 GENERATOR FRONT PLATE
113 AIR CLEANER TOP
114 AIR CLEANER BOTTOM
115 WING NUT AND SHAFT
116 TORUS HOUSING
117 FLYWHEEL
118 ROCKER SHAFT BEARING (8)
119 SPARK PLUG (8)
120 BASE FRONT
121 BASE REAR
122 BASE BRACE TOP
123 BASE BRACE BOTTOM

NON PLASTIC ACCESSORIES

124 CEMENT FOR POLYSTYRENE (1 tube)
125 SCREWS—SIZE 2-56—¼" (14)
126 SCREWS—SIZE 2-56—½" (20)
127 NUTS—SIZE 2-56—HEX (34)
128 SCREWDRIVER
129 WIRE—#28 BLACK (42 inches)
130 BATTERY CONTACT—BRASS
131 BATTERY EYELETS—BRASS (2)
132 BATTERY SWITCH CONTACT—STEEL
133 ELECTRIC MOTOR—3V PERMAG
134 DISTRIBUTOR LEAF CONTACT—STEEL
135 DISTRIBUTOR EYELET—BRASS
136 DISTRIBUTOR SPRING—STEEL
137 DISTRIBUTOR PLUG CONTACT—STEEL (8)
138 DISTRIBUTOR CENTER CONTACT—STEEL
139 BULB—3V (8)
140 VALVE SPRING (16)

RENWAL • MINEOLA, NEW YORK

1 machine screws and nuts



V-8 Motor is held together by 34 screws and nuts, thus eliminating unsightly cement burns and enabling you to disassemble, repair, adjust and reassemble your model as often as desired. Since it is not practical to provide threaded holes in this model, special "pockets" have been designed to position the nuts and to prevent them from rotating. Most of the nuts will be inaccessible for holding during assembly, and thus it is very important to properly cement the nuts in place. This is easily accomplished as follows:

1. Put a light film of cement in the "pocket".
2. Position nut in "pocket" making sure that holes in nut and plastic are aligned.
3. Remove cement from holes. (A round toothpick or similar object inserted through the nut and the hole in the plastic will also help with alignment).
4. Apply cement to top surface of nut where it contacts side walls of "pocket".

Suggestions:

- *Apply cement sparingly with small pointed object such as a toothpick, pin or small brush.*
- *Complete Steps 1 through 3 on all nuts before cementing top surface as in Step 4.*
- *Make sure that holes are free of cement.*
- *Before cementing nut in place, check threads and the hole in the plastic with one of the screws.*

We strongly urge you to follow the foregoing procedure and suggestions. A fouled nut can necessitate extensive disassembly and much unnecessary work.

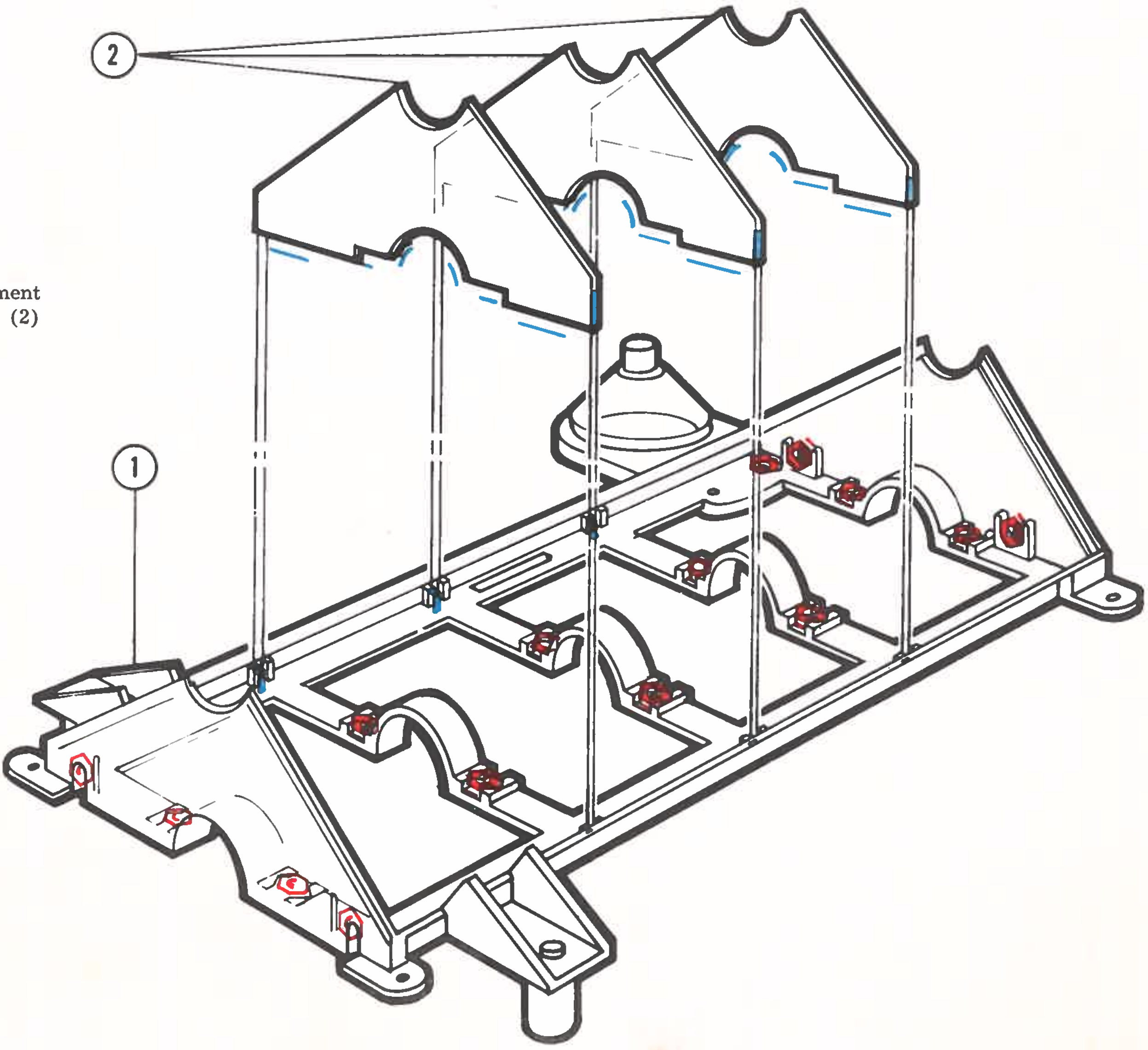
Position and cement nuts on the following **before proceeding with assembly.**

Part No.	*Description*	*Number of Nuts*	*Refer to Page No.*	*Assembly No.*
1	Main Frame	15	2	2
3	Front Block Frame	3	5	7
4	Rear Block Frame	5	5	7
7	Left Cylinder Block	2	4	6
10	Right Cylinder Block	2	4	6
91	Gear Box	4	7	13
	Total	31*		

* Three additional nuts are used but are not cemented in place at this time.

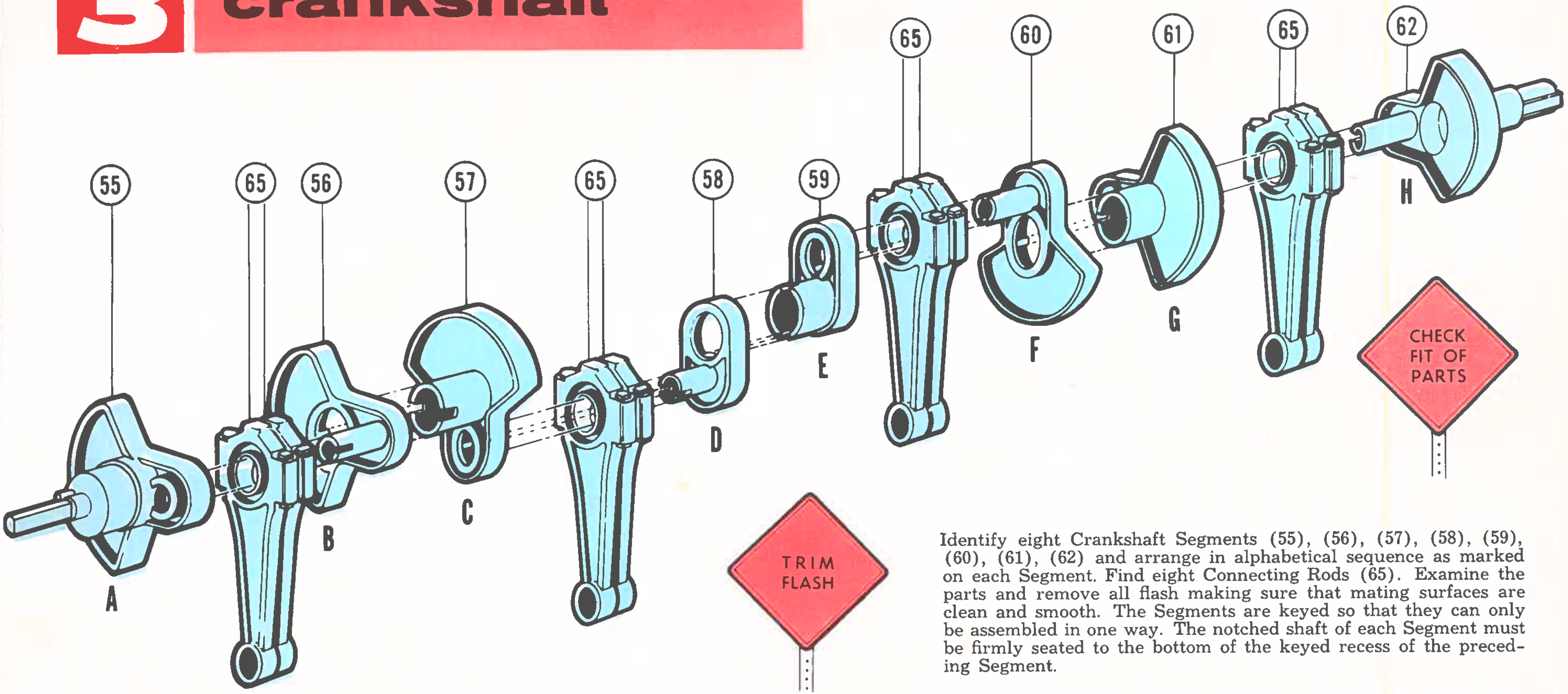
2 main frame

Check that 15 nuts are securely in place, apply cement as shown and assemble three Camshaft Supports (2) to Main Frame (1). Set aside to dry.



3

crankshaft



In operation, the Crankshaft must be free to rotate with a minimum of friction and with no binding. The Crankshaft Segments have been specially designed, engineered and manufactured so that your completed unit is self-aligning and self-locating within the five Main Bearings. The parts of the Crankshaft have been designed so as to achieve a tight fit between segments in order to eliminate cementing. However, if for any reason, such as a loose fit between a pair of segments, you deem it necessary to cement, then apply the cement sparingly inside of the keyed recess which receives the notched shaft. Do not allow cement to contact the shaft surfaces which rotate within the Main Bearings and the Connecting Rod Bearings.

Identify eight Crankshaft Segments (55), (56), (57), (58), (59), (60), (61), (62) and arrange in alphabetical sequence as marked on each Segment. Find eight Connecting Rods (65). Examine the parts and remove all flash making sure that mating surfaces are clean and smooth. The Segments are keyed so that they can only be assembled in one way. The notched shaft of each Segment must be firmly seated to the bottom of the keyed recess of the preceding Segment.

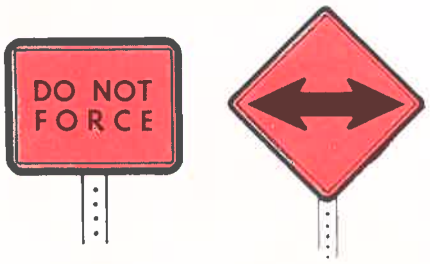
Proceed as follows and compare your work with Drawing. Insert notched shaft of "B" through bearings of two Connecting Rods and insert protruding end of notched shaft into keyed recess of "A". Press together between thumb and finger located at axis of shaft. Do not press at end of counterweights as you may break the piece. (Follow this method for succeeding segments). Assemble "C" to "B". Place Connecting Rods on Shaft of "D" and assemble to "C". Assemble "E" to "D". Place Connecting Rods on shaft of "F" and assemble to "E". Assemble "G" to "F". Place remaining two Connecting Rods on shaft of "H" and assemble to "G". Proceed directly to next step.

4

main bearings

In one hand, hold the Main Frame so that its half-bearings face upward. With other hand, lightly grasp Crankshaft near center between thumb and fingers and set it into the half-bearings of the Main Frame, making sure that the front ends of the Frame and Crankshaft are facing in the same direction. The Connecting Rods will hang down through the four open panels of the Frame. Now set the Main Frame down on a level surface, moving the Connecting Rods to either side, whichever is more convenient. The Frame is now resting on points of the Camshaft Supports.

Identify two End Main Bearings (63) (holes are off-center and they are marked with an arrow). Find the three Center Main Bearings (64) (holes are centered).

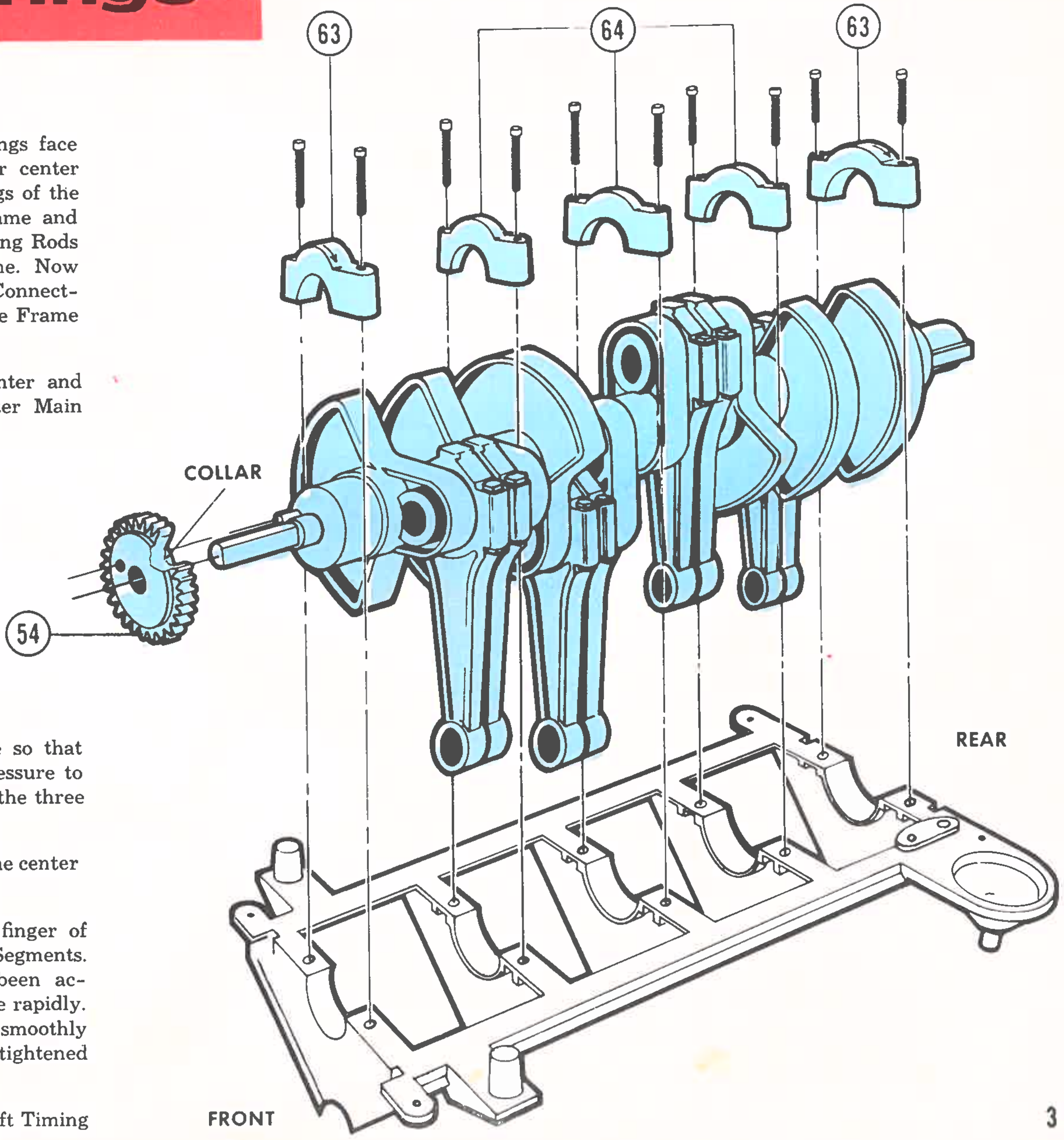


Use ½" screws and fasten End Bearings to Main Frame so that each arrow points as shown in drawing. Do not exert pressure to tighten screws as you may crack the plastic parts. Fasten the three Center Bearings in place in the same manner.

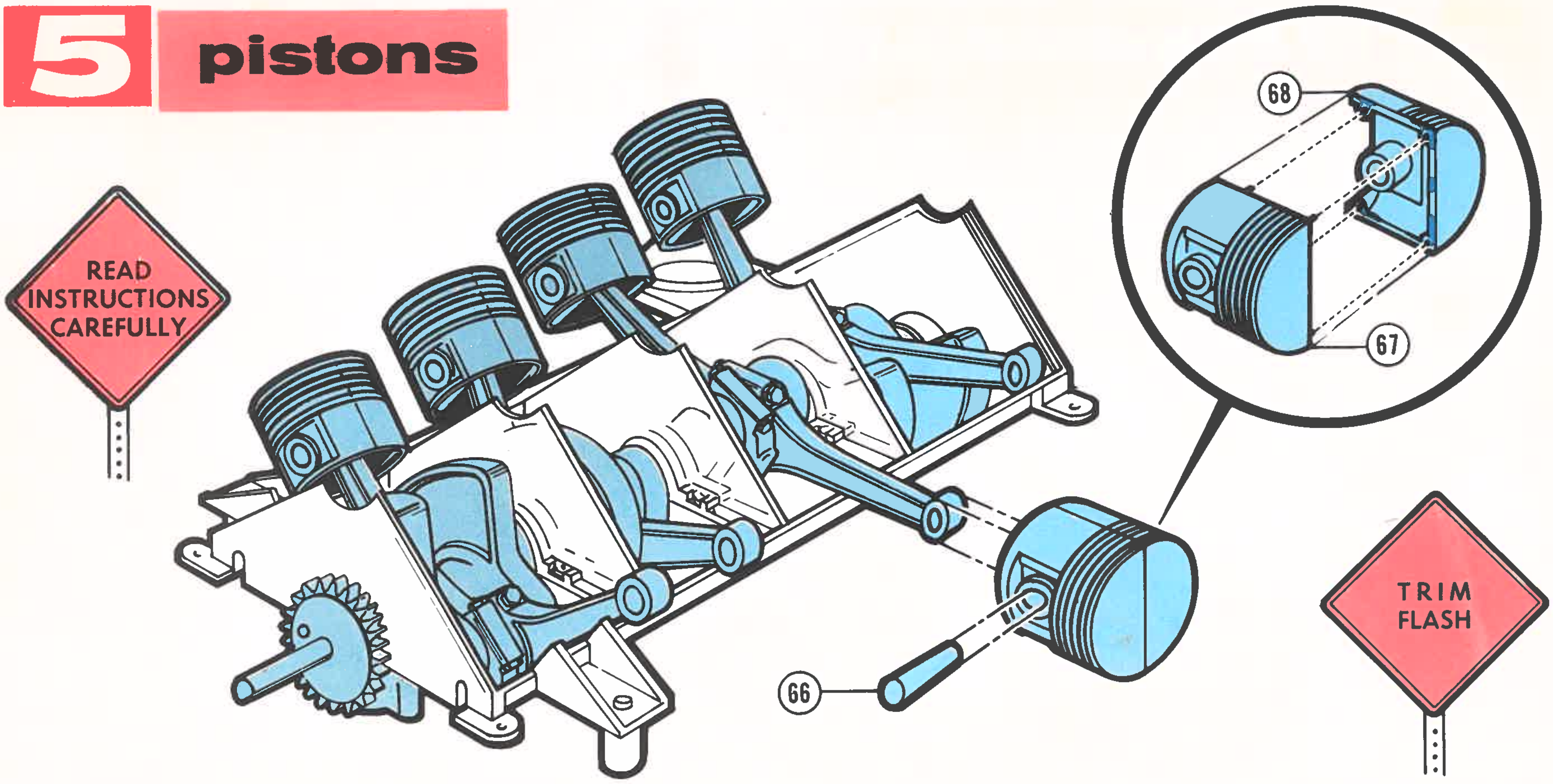
Place a drop of light vegetable oil *(NOT mineral oil)* in the center hole of each Bearing to keep friction at a minimum.

Take both ends of Crankshaft between the thumb and finger of each hand and rotate slowly observing action of all Segments. After several revolutions, self-alignment should have been accomplished. Back off ¼ turn on all screws and rotate more rapidly. Crankshaft and Connecting Rods should rotate freely and smoothly without binding. Screws may be left in this position or tightened to the point where they do not cause binding.

With spacing collar toward engine, assemble the Crankshaft Timing Gear (54) to front of Crankshaft.



5 pistons

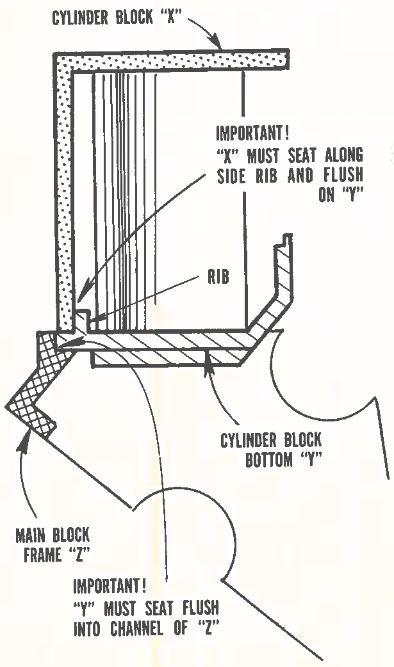


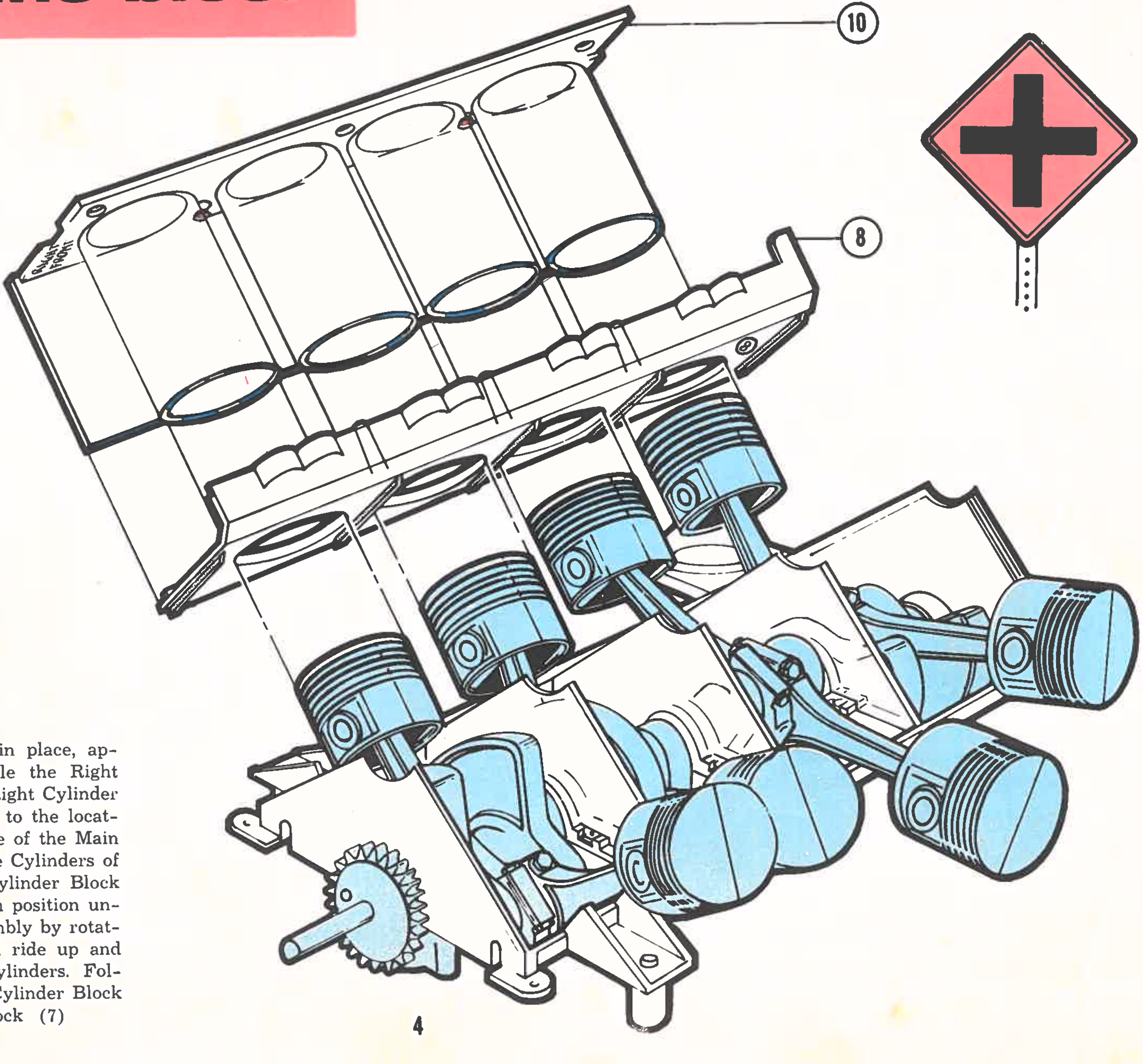
Turn the assembly right-side-up so that it is resting on the Main Bearings with the front facing to the left. Separate each pair of Connecting Rods so that the front Rod of each pair is toward the righthand side of the engine (away from you), and the rear Rod of each pair is on the lefthand side (toward you). This step is extremely important to the assembly of the Pistons, since if not correct, the Pistons will not fit into the Cylinders.

Cement Piston Halves (67) and (68) together to make eight Pistons. Assemble four Pistons to the Connecting Rods of one bank before starting other bank in order to maintain the proper relationship. Fit the Piston to the Connecting Rod so that the holes are aligned. Insert Wrist Pin (66) through holes wedging the thicker end of Wrist Pin in Piston Wall. Piston is now attached to Connecting Rods in such a manner that it can move freely inside of Cylinder. Set aside.

6 engine block

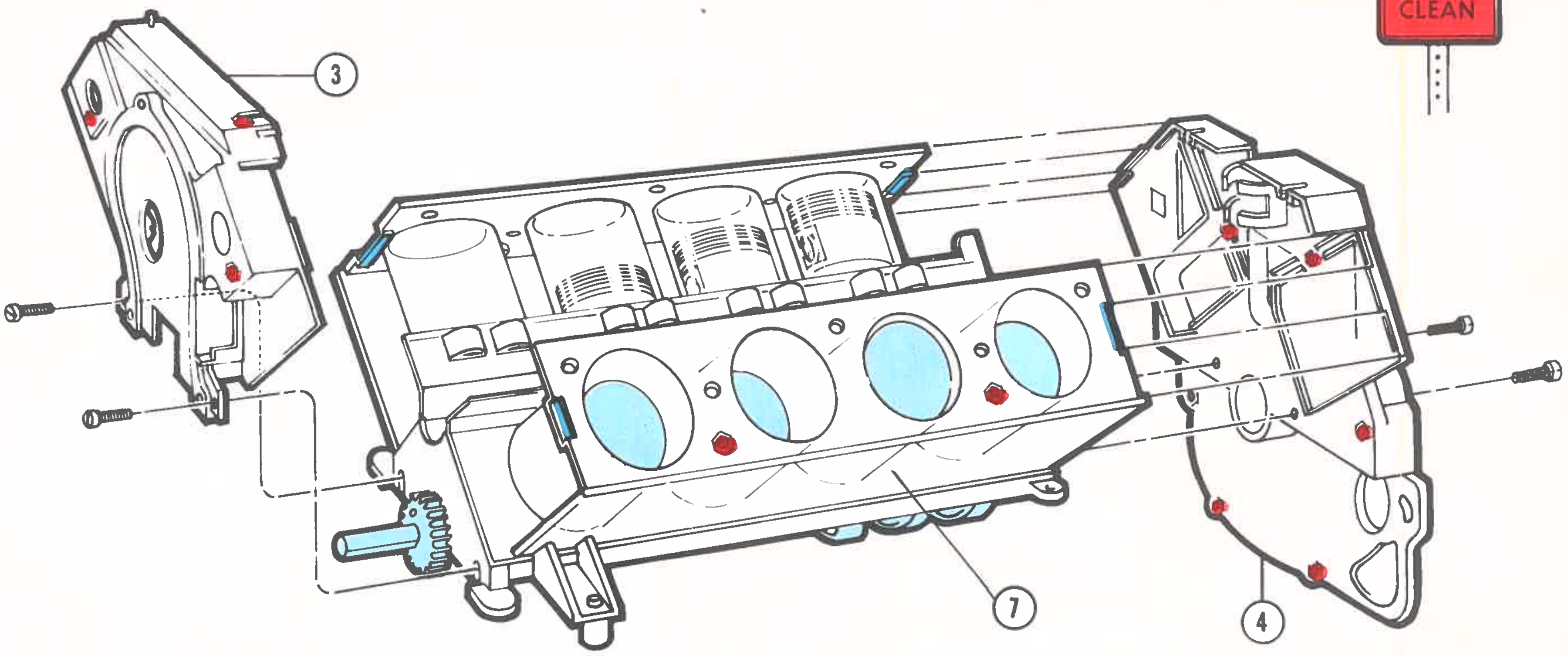
SECTION THROUGH ASSEMBLED ENGINE BLOCK


CYLINDER BLOCK "X"
IMPORTANT! "X" MUST SEAT ALONG SIDE RIB AND FLUSH ON "Y"
RIB
CYLINDER BLOCK BOTTOM "Y"
MAIN BLOCK FRAME "Z"
IMPORTANT! "Y" MUST SEAT FLUSH INTO CHANNEL OF "Z"



Check that the nuts are securely in place, apply cement as shown and assemble the Right Cylinder Block Bottom (8) to the Right Cylinder Block (10). Apply cement sparingly to the locating ridge which runs along the edge of the Main Frame. Fit the four Pistons into the Cylinders of the Cylinder Block and seat the Cylinder Block firmly on the Block Frame. Hold in position until cement has set and test the assembly by rotating the Crankshaft. Pistons should ride up and down freely and smoothly in the Cylinders. Follow same procedure with the Left Cylinder Block Bottom (11) and Left Cylinder Block (7)

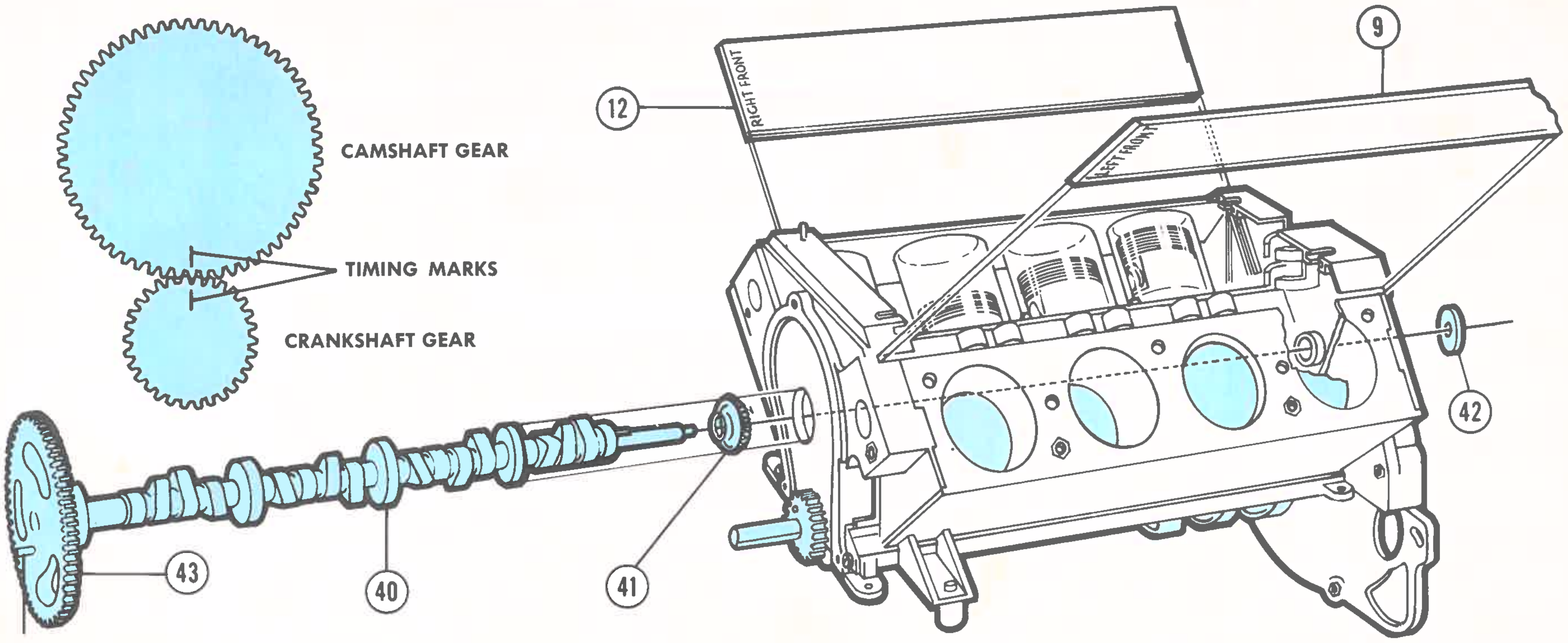
7 front and rear frames



Check that the 3 nuts are securely in place and slide the Front Frame (3) into position between the Timing Gear and Main Frame observing that diagonal ridges extending downward from the center of the Front Frame should seat squarely on the front of the Main Frame, and that walls of the Cylinder Block Bottoms should seat into the diagonal grooves running upward from the center of the Front Frame.

Fasten with two ¼" screws, but before tightening screws, apply cement to snap locks as shown and secure the top of the Front Frame to the Cylinder Blocks by pressing together to engage the snap locks.

Check that 5 nuts are securely in place and in like manner, the Rear Frame (4) is assembled to the Main Frame using two ¼" screws.



Slide the Right Cylinder Block Wall (12). downward between the Front and Rear Frames. Note that rectangular guide notches to receive the Wall have been formed between the Front and Rear Frames and the Cylinder Block. The Wall has been engraved to identify its front, and its rabetted bottom edge will mate with the riser of the Cylinder Block Bottom so that no cement is required to retain the Wall.

In like manner, assemble the Left Cylinder Block Wall (9).

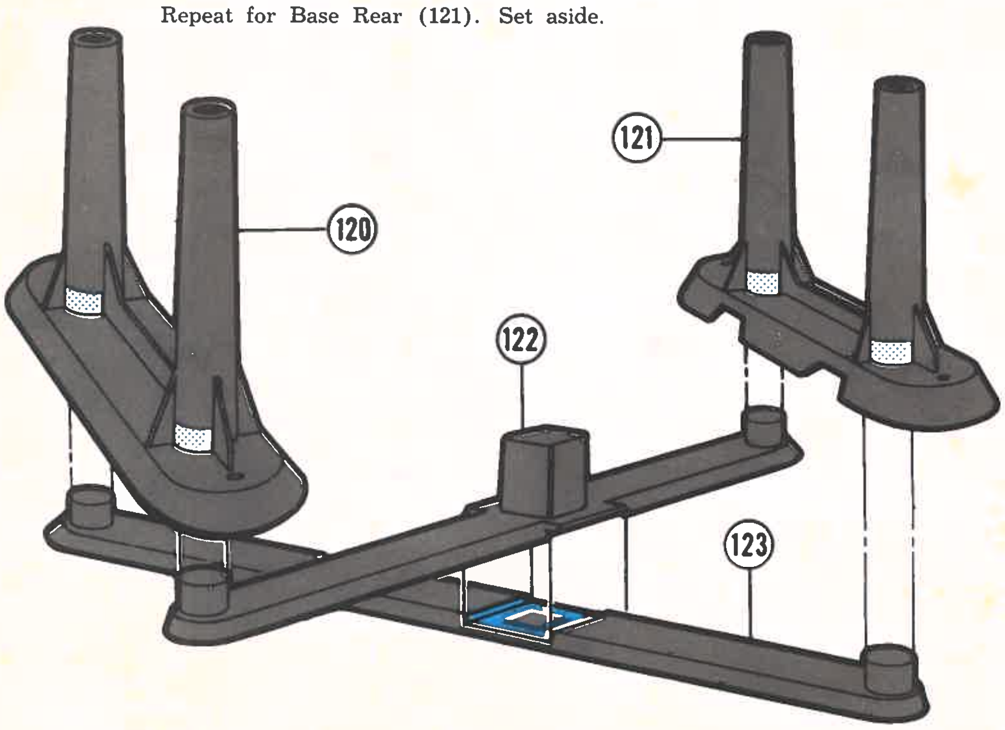
Without cement, press the Camshaft Timing Gear (43) onto the front end of the Camshaft (40). Seat firmly with surface having pin facing toward the front. Press the Camshaft and Bevel Gear (41) onto the rear end of the Camshaft with small diameter of Gear facing toward the rear. Insert the rear end of Camshaft through the center hole of the Front Frame, and then through the bearing hole in the Rear Frame.

Before engaging the two Timing Gears, rotate the Crankshaft until timing mark is in top center position. Rotate the Camshaft Timing Gear until its timing mark is in bottom center position. Engage the Timing Gears so that the two marks form a continuous straight line.

Without cement, press the Camshaft Retainer (42) onto the end of the Camshaft protruding through the Rear Frame. The Camshaft and Crankshaft are now synchronized so that the valves will open and close at the correct instant of each Piston stroke. Set aside.

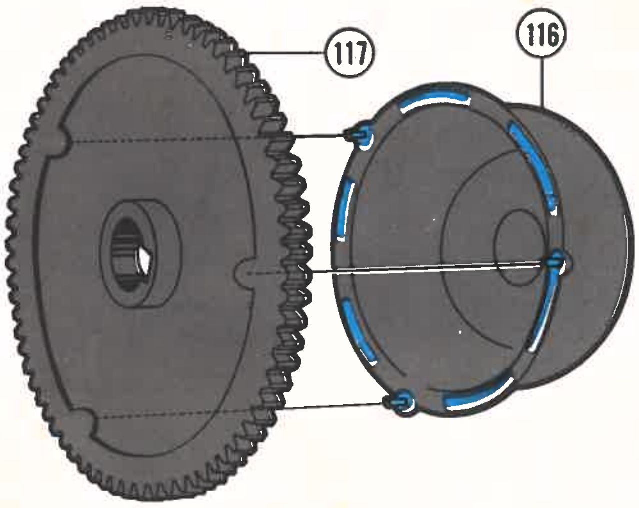
8 base

Apply cement in cutout of Bottom Cross Brace (123) and assemble Top Cross Brace (122). Apply cement inside the holes in the bottom of Base Front (120) and fit over studs on Cross Braces. Repeat for Base Rear (121). Set aside.



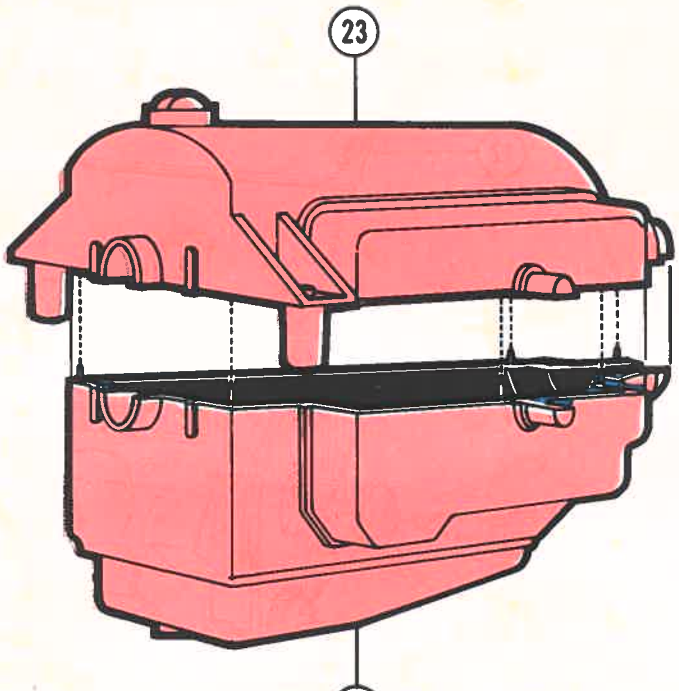
9 flywheel

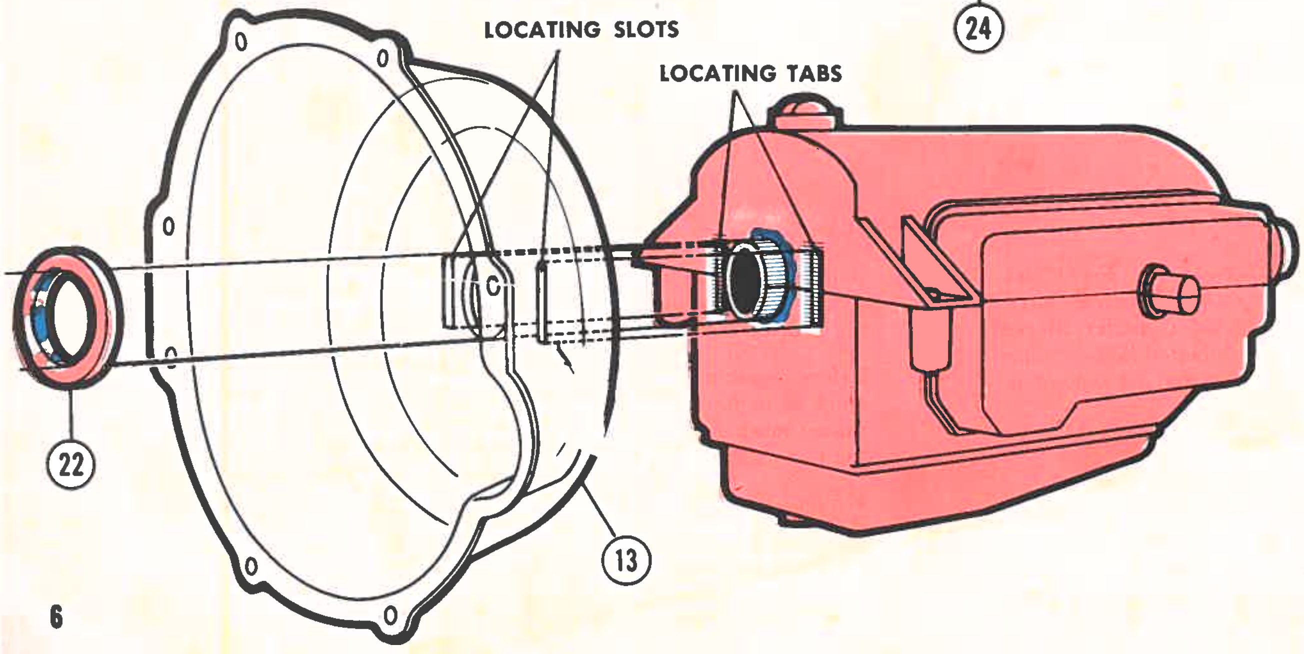
Cement Torus Housing (116) to Flywheel (117) as shown and set aside to dry.



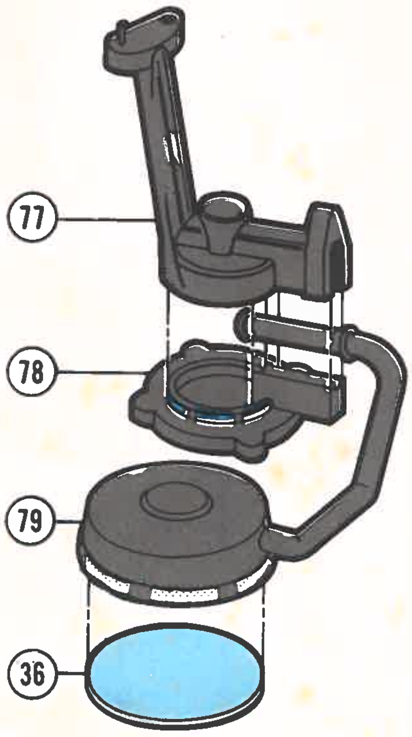
10 transmission and bell housing

Cement together Transmission Top (23) and Transmission Bottom (24) as shown. Find Bell Housing (13) and note dissimilar lengths of the locating slots. Fit Bell Housing firmly to Transmission as determined by locating tabs. Apply cement to the neck and tabs of the Transmission from the inside of the Bell Housing and then fit the Bell Housing Lock Ring (22) over the neck. Avoid unsightly cement burns, but be sure that a solid bond is obtained between Transmission and Bell Housing as this joint must support considerable weight. Set aside to dry.





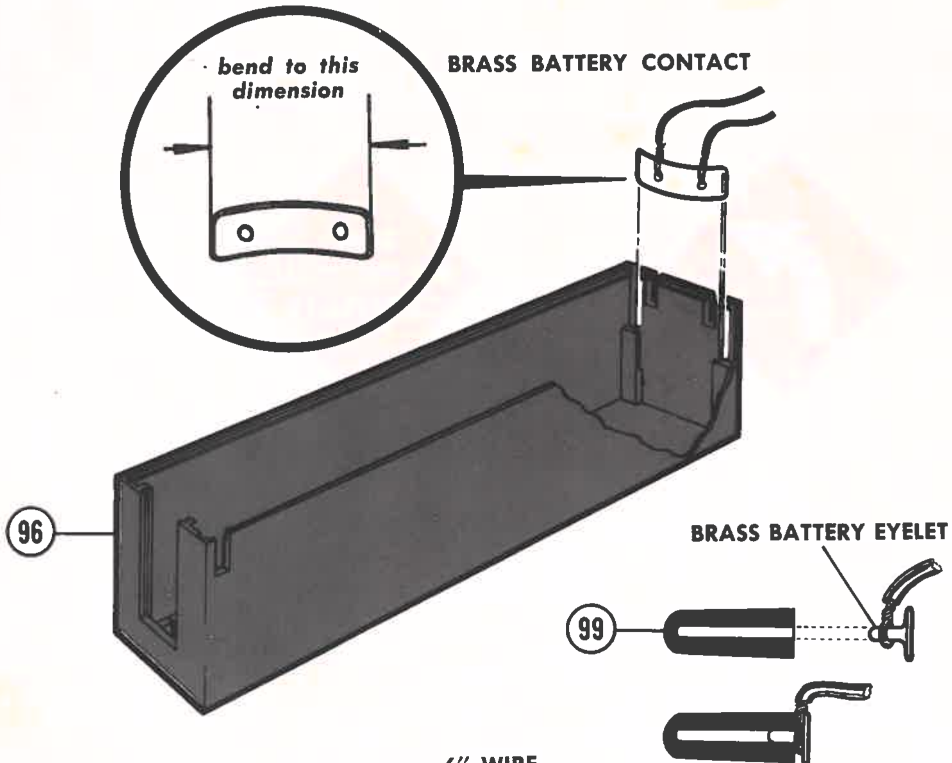
11 oil pump



Apply cement to ledge inside of Screen Housing (79) and insert Screen (36) so that Screen pattern is visible. Insert pipe of Screen Housing into recess of the Oil Pump Top (77).

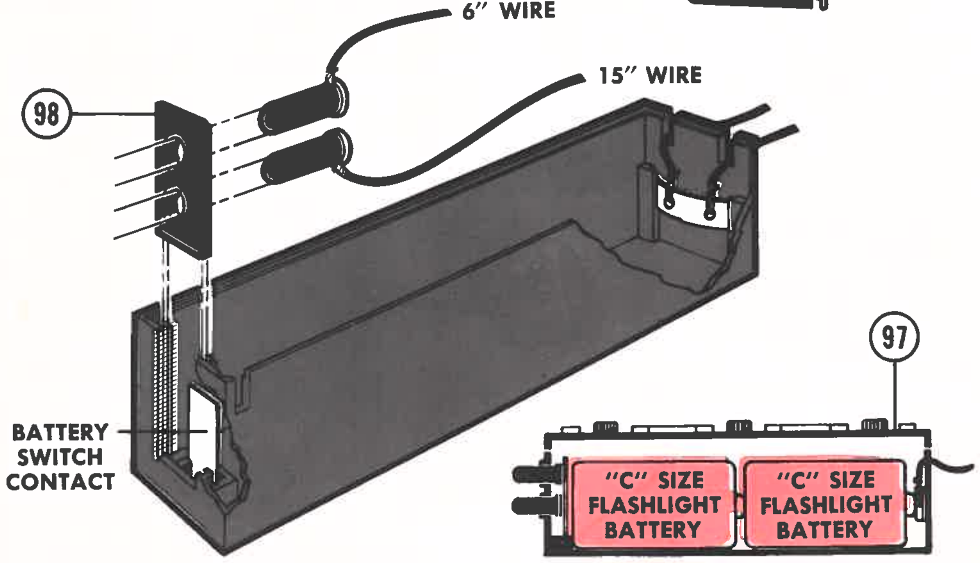
Apply cement to ring on Oil Pump Bottom (78) and assemble to Oil Pump Top trapping the pipe. The pipe should pivot freely since the Screen floats on the oil in a real motor. Set aside.

12 battery



Cut two 15″ and two 6″ lengths of wire (sufficient wire has been included, cut longer lengths first). Strip off insulation so that ½″ of wire is bared at both ends of all lengths. (You can strip this wire between your thumbnail and finger after making a small nick in the insulation.) Find the brass Battery Contact and bend to shape so that the distance between its ends is as shown on drawing. Connect one 15″ length and one 6″ length of wire by inserting bared ends through the holes and twisting until secure. Position the Battery Contact (with wires attached) in the Battery Case (96) by locating in grooves provided and pushing downward until seated against stop.

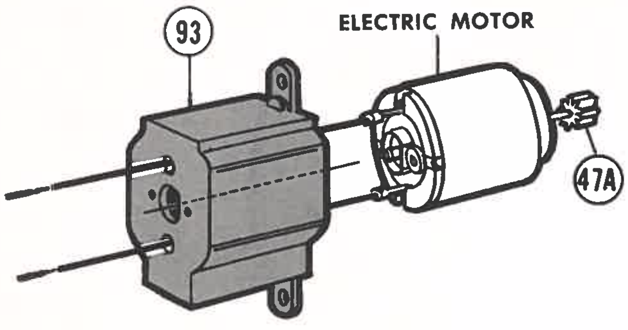
Find two Battery Switch Buttons (99) and two brass Battery Eyelets. Insert Eyelets about halfway into Switch Buttons. The two remaining lengths of wire are connected, each to one of the Switch Buttons, by trapping the wire between the plastic Button and the flange of the Eyelet as it is forced completely into the Switch Button.



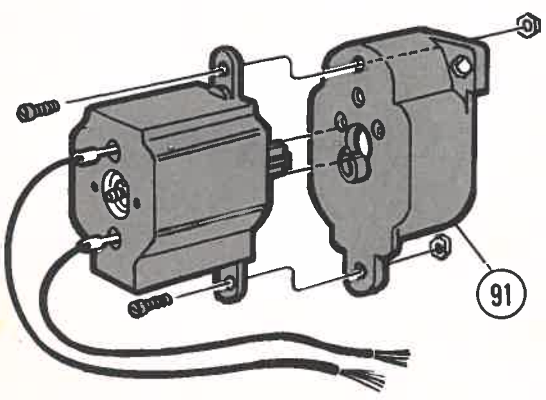
Find the Battery Switch Contact and position in the case as shown. Find the Battery Switch Plate (98) and note that the top hole is identified as "Motor" and the lower hole as "Coil" on its outer surface. The Switch Button with long lead is for the Coil and the short lead is for the Motor. Insert Buttons through the proper holes so that wire will be inside the Battery Case when assembled. Slide the Switch Plate into position and secure with a touch of cement.

Put two "C" size flashlight batteries into case as shown, and without cement, snap Battery Case Cover (97) into place. When properly assembled, the upper Button will energize the Motor and the lower Button the Ignition System (Spark Plugs Lights). As a safety feature, to avoid undue, prolonged operation which would shorten battery life, the Switch is designed so that the Buttons must be pressed and held during operation.

13 motor

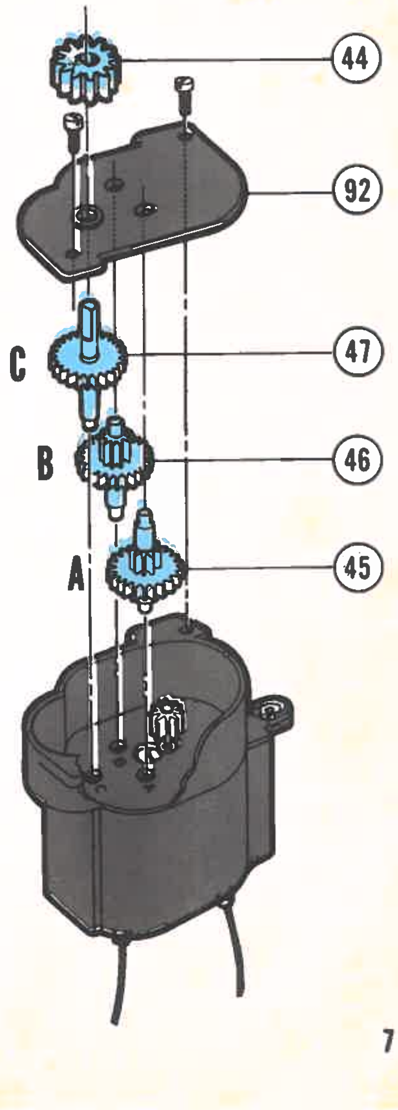


Insert the wire leads of the Electric Motor through the holes in the Motor Housing (93). Slide the Motor into the Housing until the "D" shaped bearing of the Motor is seated in the center hole as shown. *(Motor should fit tightly in Housing with practically no up and down movement possible since such movement could disengage the Motor Pinion from the Gear Train).* The Motor Pinion (47A) is now passed through the larger of the two circular openings in the Gear Box (91) and then the front bearing of the Motor is seated in the small circular collar. Use two ¼″ screws, and fasten Gear Box to Motor Housing.



Find Gears A, B and C (45), (46) and (47). Remove any burrs and flash and check the fit of both ends of each shaft in the bearing holes of the Gear Box and Gear Box Cover (92). Test each gear separately for free rotation. Apply Vaseline to shafts and teeth and position in Gear Box as shown in drawing. Assemble Gear Box Cover by inserting longest shaft through the large hole. Position the two remaining shafts in the smaller holes and press the Cover into place. Fasten with two ½″ screws.

Remove burrs and flash from Flywheel Pinion Gear (44) and cement to shaft protruding through Gear Box so that X is toward outside as shown.

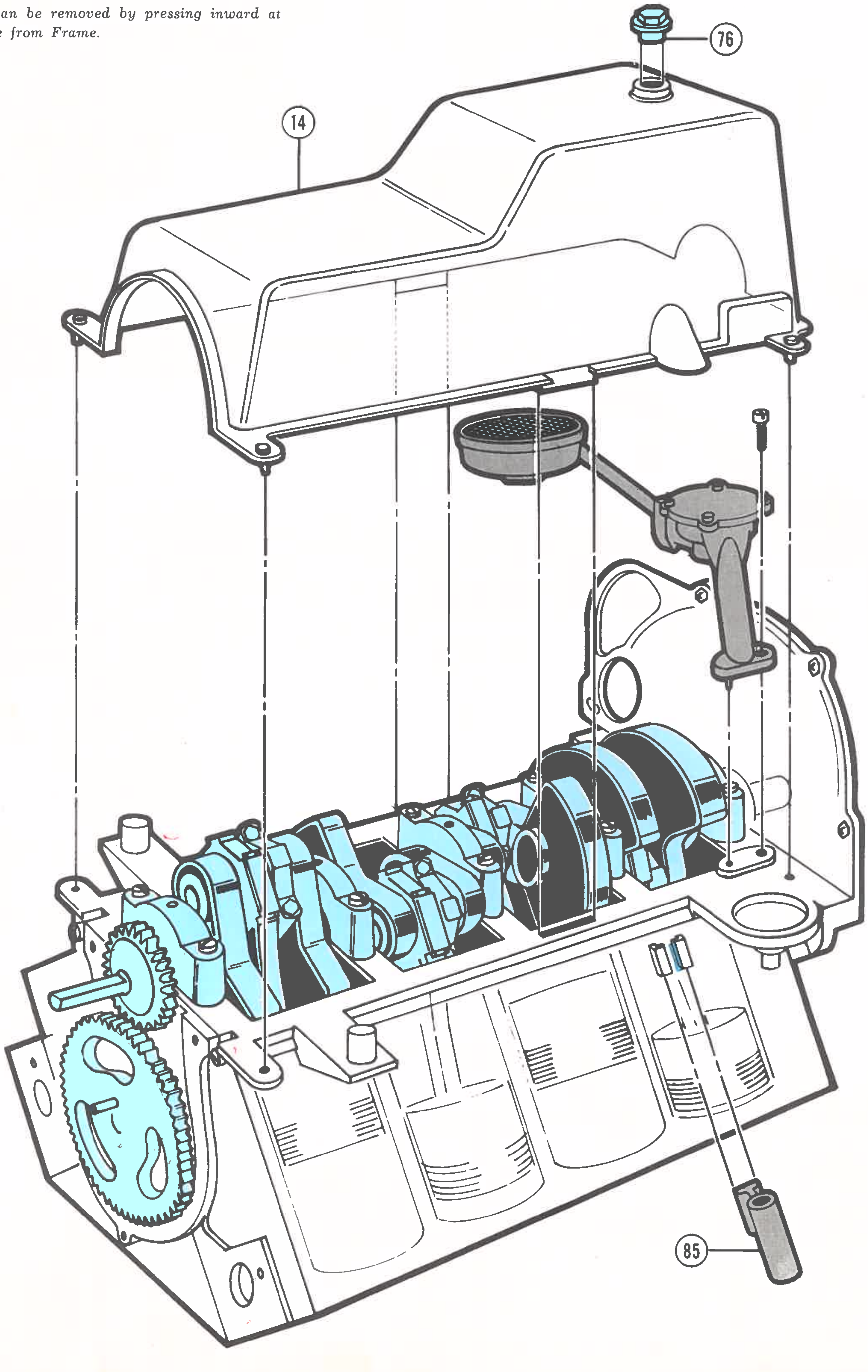


This assembly should now be tested. Connect the Motor Leads to the shorter wires at each end of the Battery Case and press Motor Switch Button. The Pinion Gear should rotate at about 100RPM. The normal sound of Motor and Gears will, of course, be amplified by the plastic housing. The sound, though loud, should be smooth. Erratic grinding noises may be due to flash and burrs on Gear Teeth and will diminish as your Gear Train breaks in. Break-in runs are advisable, but should be limited to about 10 minutes each, with sufficient time between runs to allow the batteries to recuperate. If the assembly does not operate properly, retrace your steps making sure that each component is in working order as previously instructed.

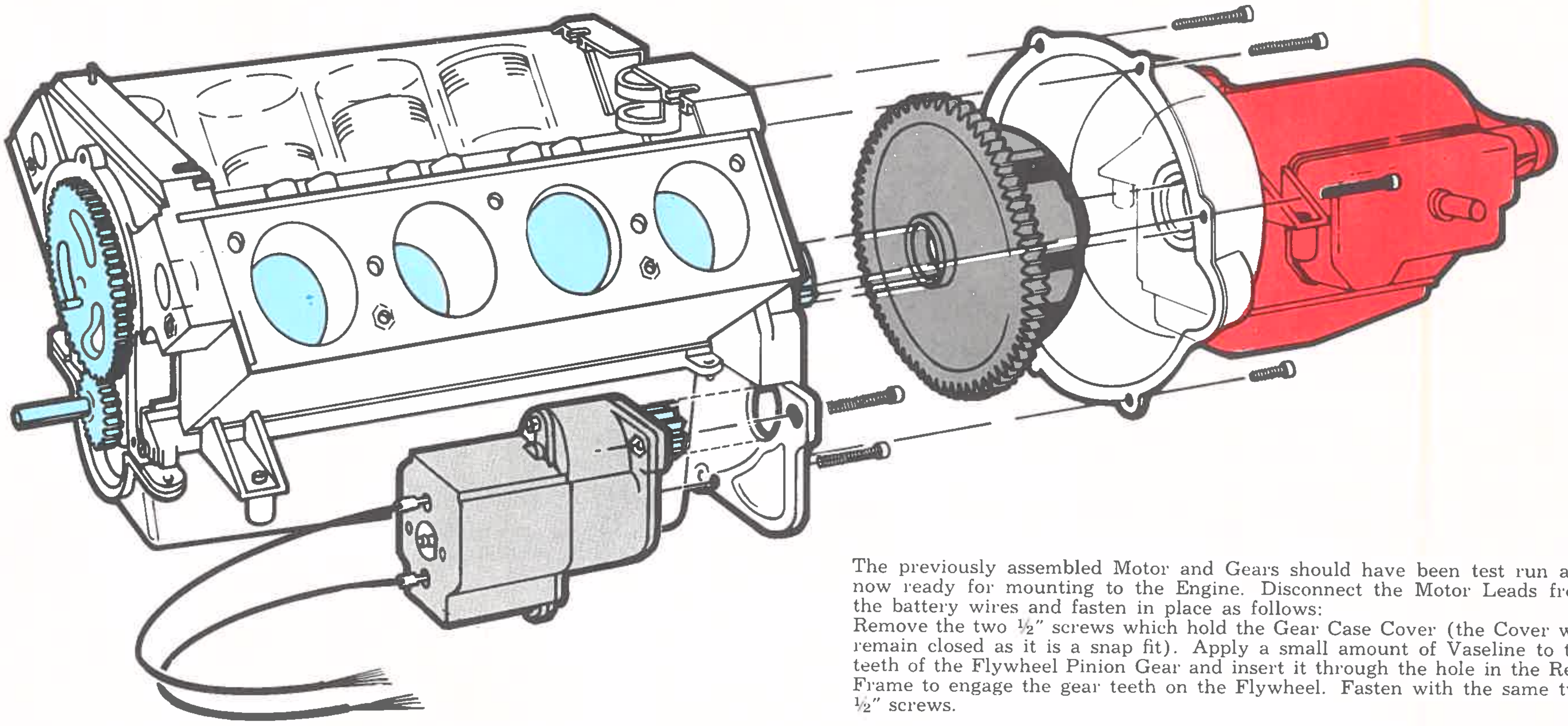
14 oil pan

Turn the engine-block upside-down and using one ¼″ screw, fasten the Oil Pump assembly in place as shown. Insert Drain Plug (76) into hole in Oil Pan (14) and without cement, assemble the Oil Pan to the Main Frame, making sure that the four locating studs at each corner are in holes provided and that the two snap-tabs are in slots.* Find the Oil Stick Sleeve (85) and determine its correct position from drawings. When you are sure of its proper assembly, place the smallest drop of cement into the slot provided and slide the T shaped locator in place.

* *Note that Oil Pan can be removed by pressing inward at snap tabs to disengage from Frame.*



15 transmission to engine



Without cement, press Flywheel assembly onto the Crankshaft.

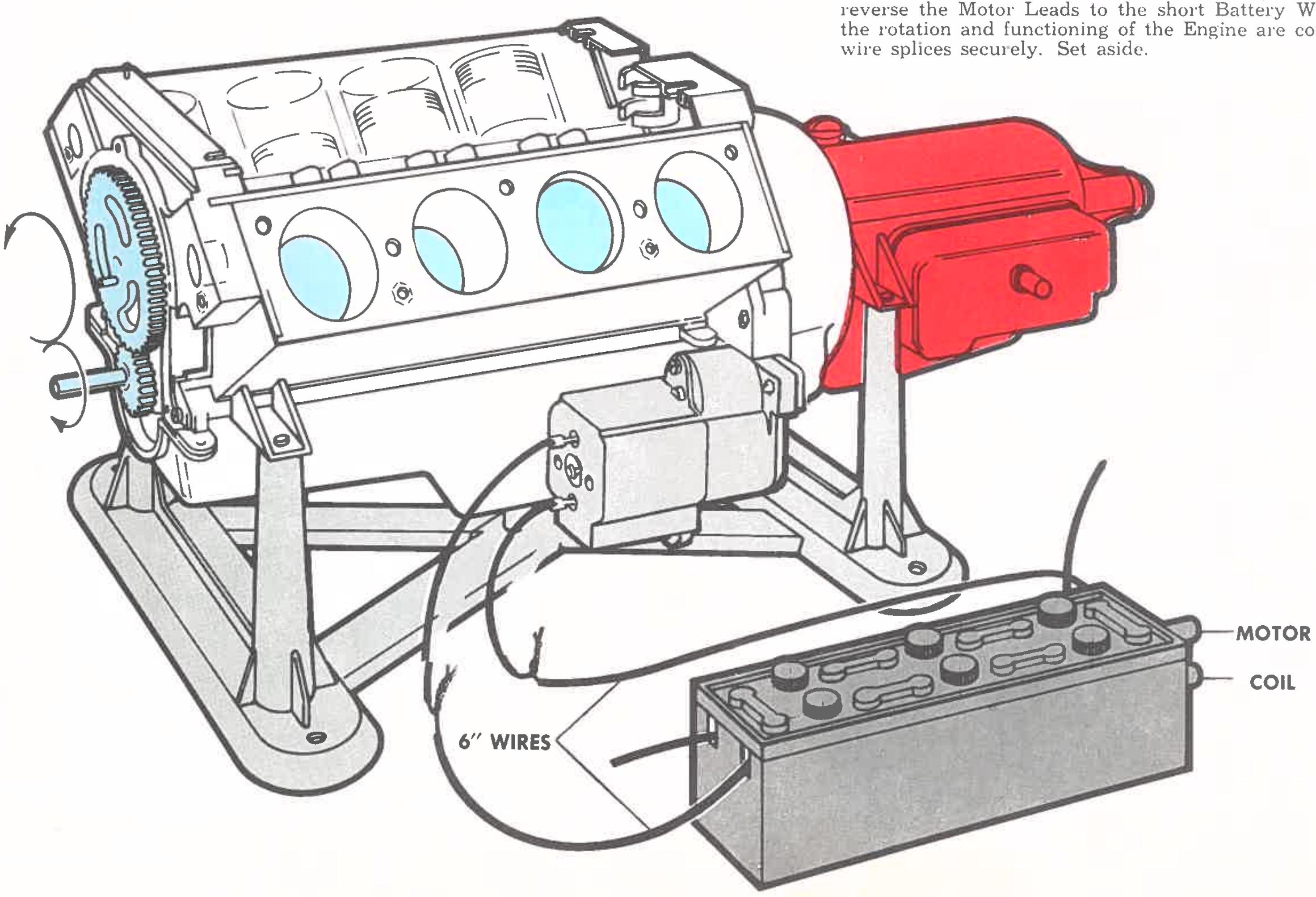
Position the Bell Housing over the Flywheel so that screw holes line up with nuts in the Rear Frame. Fasten together with three ½" screws along upper half of circle, and two ¼" screws at bottom.

The previously assembled Motor and Gears should have been test run and now ready for mounting to the Engine. Disconnect the Motor Leads from the battery wires and fasten in place as follows:
Remove the two ½" screws which hold the Gear Case Cover (the Cover will remain closed as it is a snap fit). Apply a small amount of Vaseline to the teeth of the Flywheel Pinion Gear and insert it through the hole in the Rear Frame to engage the gear teeth on the Flywheel. Fasten with the same two ½" screws.

Note that provision has been made for manual operation of the Visible V-8. Loosen the top screw slightly and it can ride in the slot so that the gears may be disengaged by pivoting the entire Motor and Gear Case. This will be extremely helpful in checking out the operation of the various parts, in locating troublesome electrical connections of the Ignition System and for more intense study of the operating features.

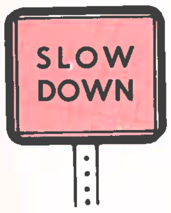
16 engine on base

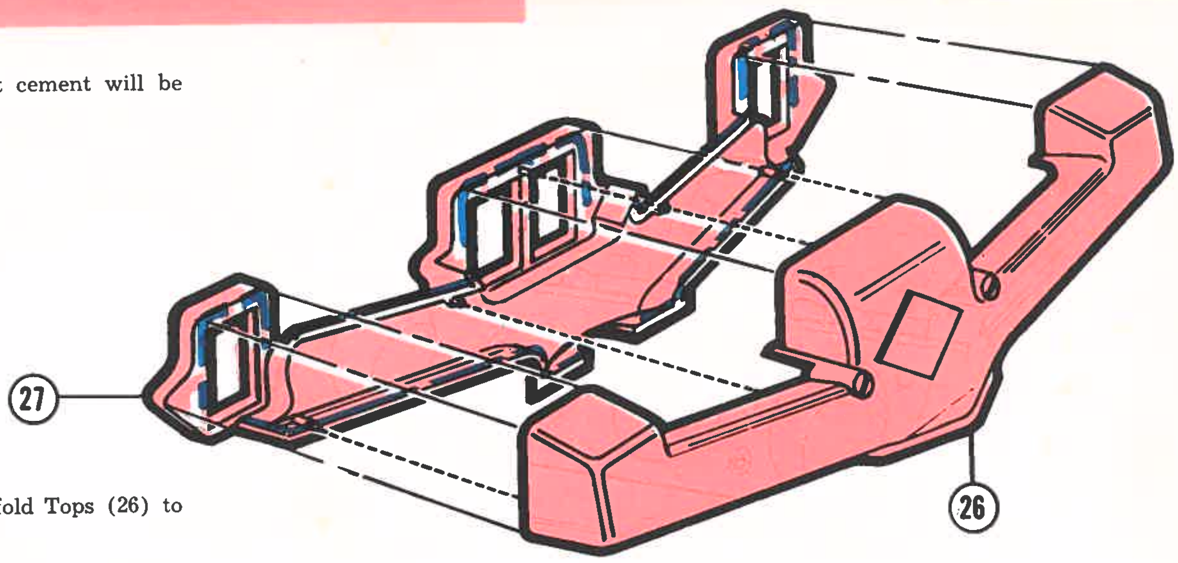
The Engine is now mounted on its base as shown. Follow the drawing carefully and reconnect the Motor Leads to the short wires of the Battery Case. Press Switch Button to operate Engine and observe the rotation of the Timing Gears. The Crankshaft Gear should rotate clockwise and the Camshaft Gear counter-clockwise. If your Engine is rotating in the opposite direction, merely reverse the Motor Leads to the short Battery Wires. After you are certain the rotation and functioning of the Engine are correct to this point, tape the wire splices securely. Set aside.



17 exhaust manifolds

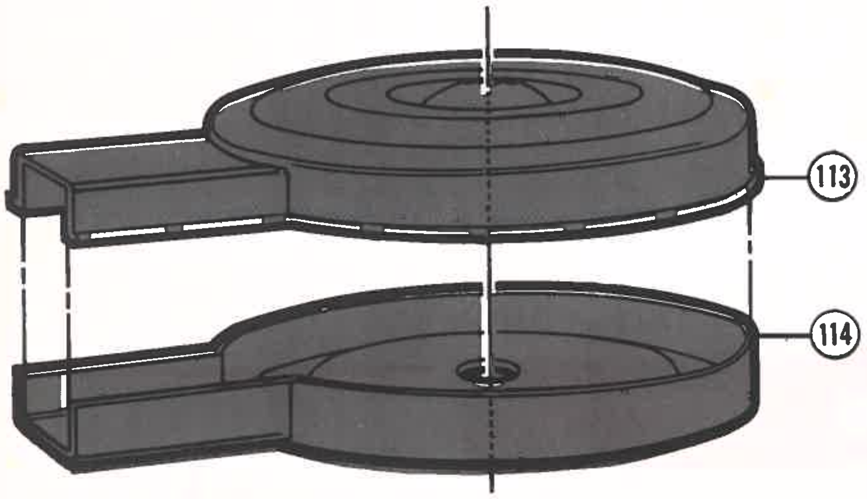
Complete the following series of sub-assemblies so that cement will be set when parts are used in final assembly.





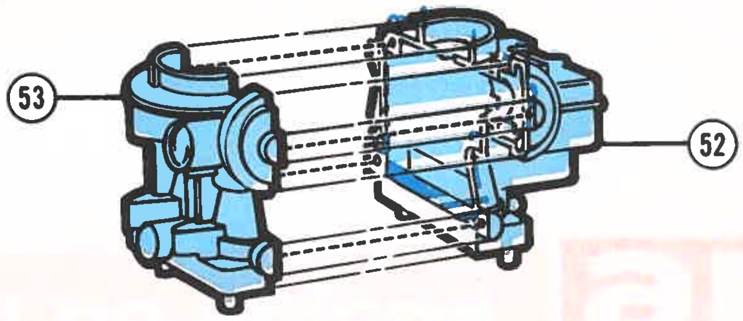
Apply cement as shown and assemble two Exhaust Manifold Tops (26) to Exhaust Manifold Bottoms (27L) and (27R).

18 air cleaner



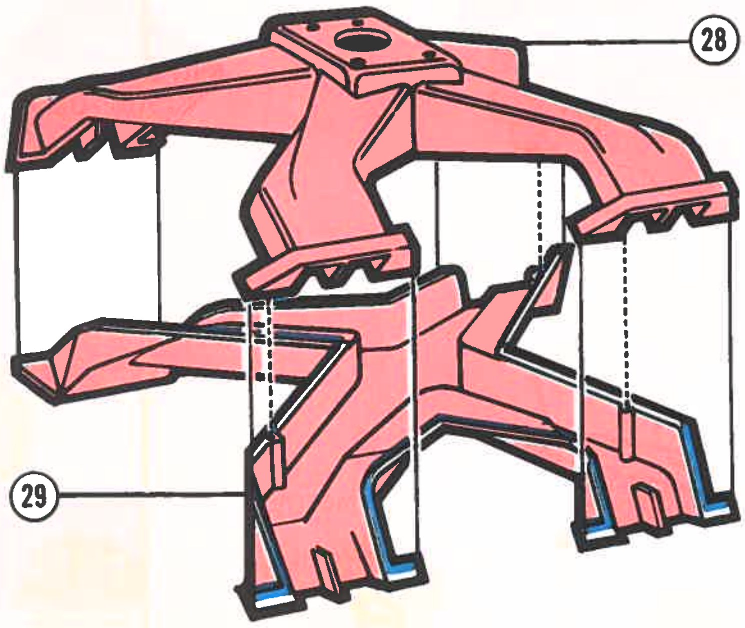
Apply cement at several spots on the inside wall of the Air Cleaner Top (113) and assemble it to Air Cleaner Bottom (114).

19 carburetor



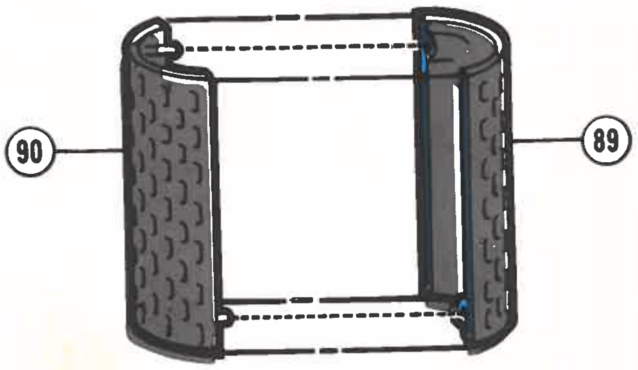
Cement the Carburetor Front (52) to the Carburetor Rear (53).

20 intake manifold



Apply cement as shown to the Intake Manifold Bottom (29) and assemble to Intake Manifold Top (28).

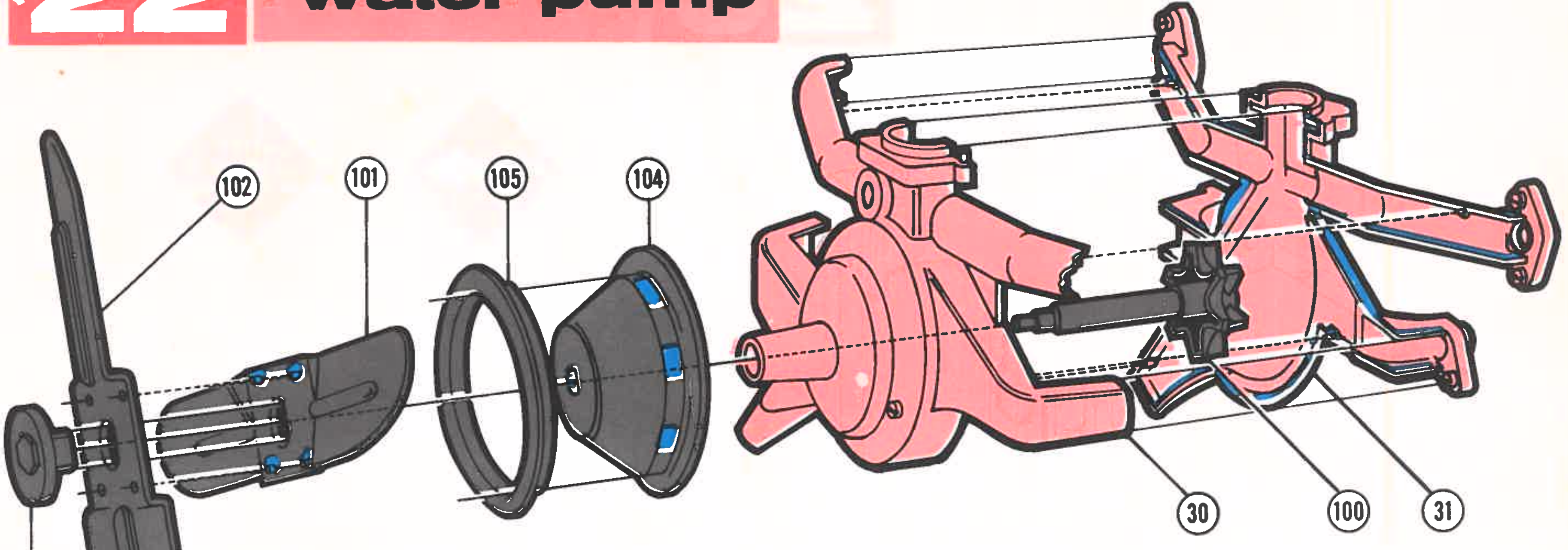
21 oil filter

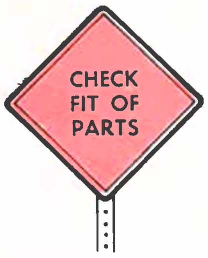


Cement together the halves of the Oil Filter (89) and (90).

Set aside.

22 water pump

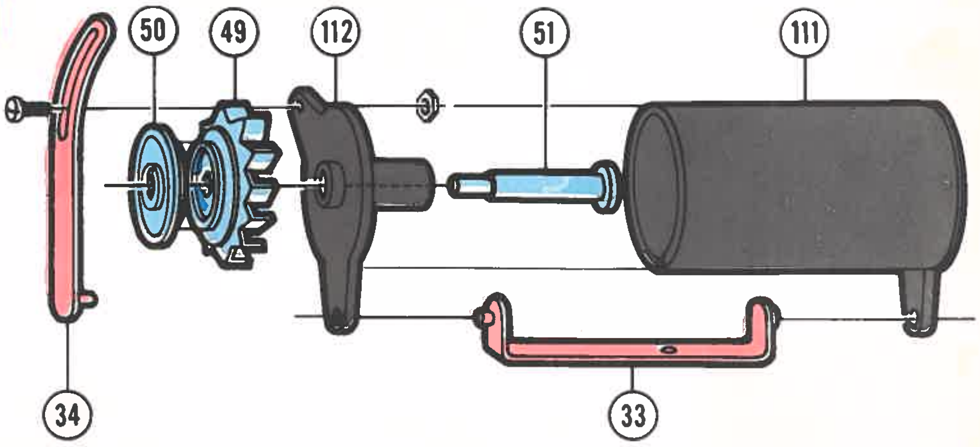




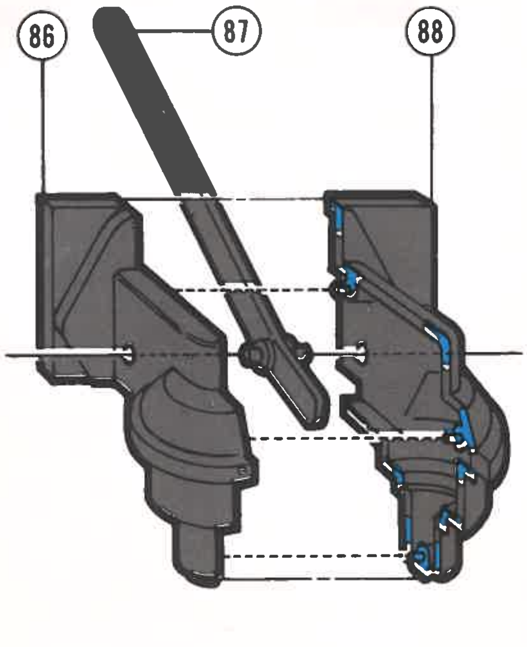
Insert the Fan Retainer (103) into the D shaped hole of Front Fan Blade (102) so that the D shaped shaft protrudes from the surface having the locating holes as shown.
Apply cement to the Rear Fan Blade (101) and assemble as shown. Set aside.
Cement the Fan Pulley Ring (105) to the Fan Pulley (104) so that a V groove is formed in which the Fan Belt will ride. Find the Impeller (100) and insert its shaft through the bearing sleeve of the Water Pump Front (30). Apply a little cement into the D shaped hole of the Fan Pulley and press it firmly onto the shaft of the Impeller. When properly assembled, the smaller D shaped end of the shaft will protrude from the front surface of the Fan Pulley. Now apply cement as shown to the Water Pump Rear (31) and join to the Front. Press the assembled Fan onto the D shaped shaft using cement only if fit is loose.

23 generator

Apply cement as shown to Generator Fan (49) and assemble to Generator Pulley Ring (50). Lubricate the thicker section of the Generator Fan Shaft (51) and insert it through the sleeve bearing of the Generator Front Plate (112) as shown. Carefully apply a small drop of cement to the hole of the Generator Fan Pulley and assemble it to the protruding end of the shaft.
Avoid excess cement. Generator Fan must be able to spin freely. Apply cement to locating ring on the Front Plate and assemble to Generator Case (111), at the same time trapping the Generator Bracket (33) as shown. Fasten the Generator Tension Rod (34) to upper hole in Front Plate with ¼″ screw and nut. Set aside.



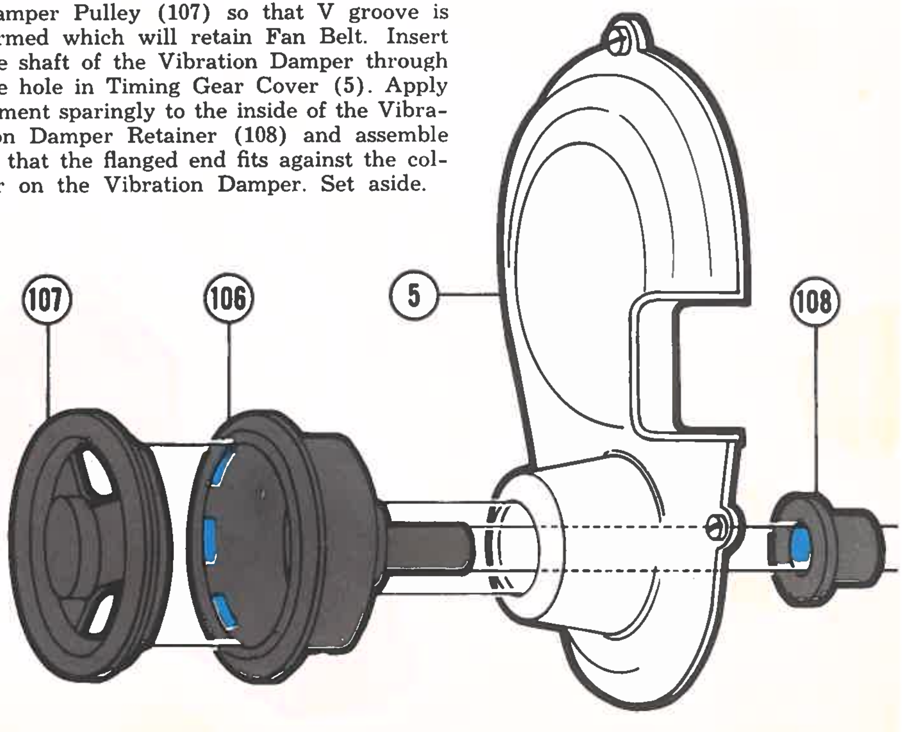
24 fuel pump



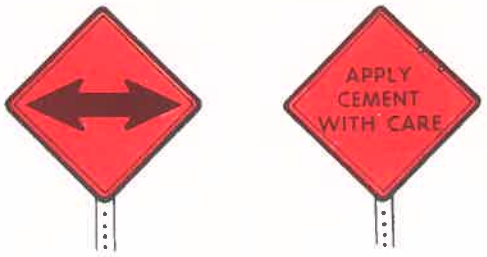
The Fuel Pump Rocker Arm (87) has two studs of different size to insure correct assembly. Check for proper positioning into the holes of the Fuel Pump Front (86) and the Fuel Pump Rear (88). When you are sure of the correct positioning, apply cement sparingly and assemble as shown.

25 vibration damper

Apply cement as shown inside the Vibration Damper (106) and assemble the Vibration Damper Pulley (107) so that V groove is formed which will retain Fan Belt. Insert the shaft of the Vibration Damper through the hole in Timing Gear Cover (5). Apply cement sparingly to the inside of the Vibration Damper Retainer (108) and assemble so that the flanged end fits against the collar on the Vibration Damper. Set aside.

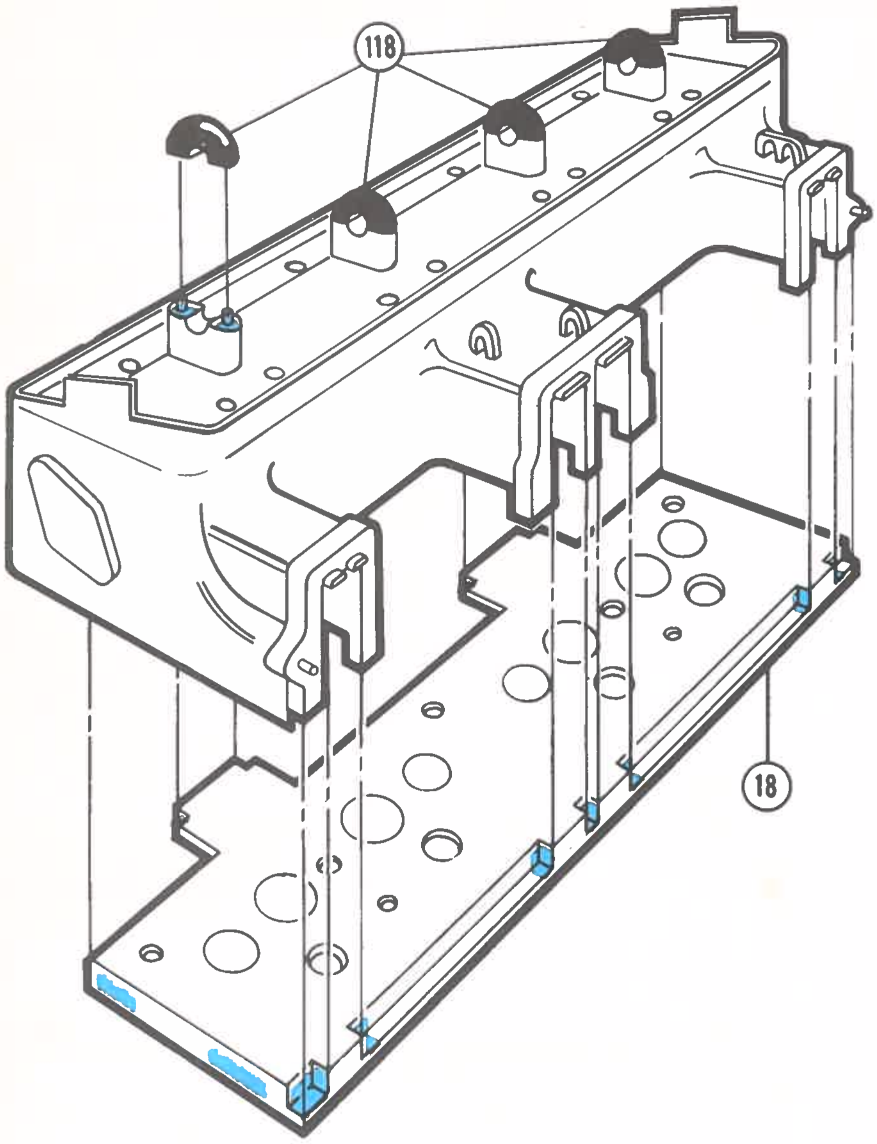


26 cylinder heads

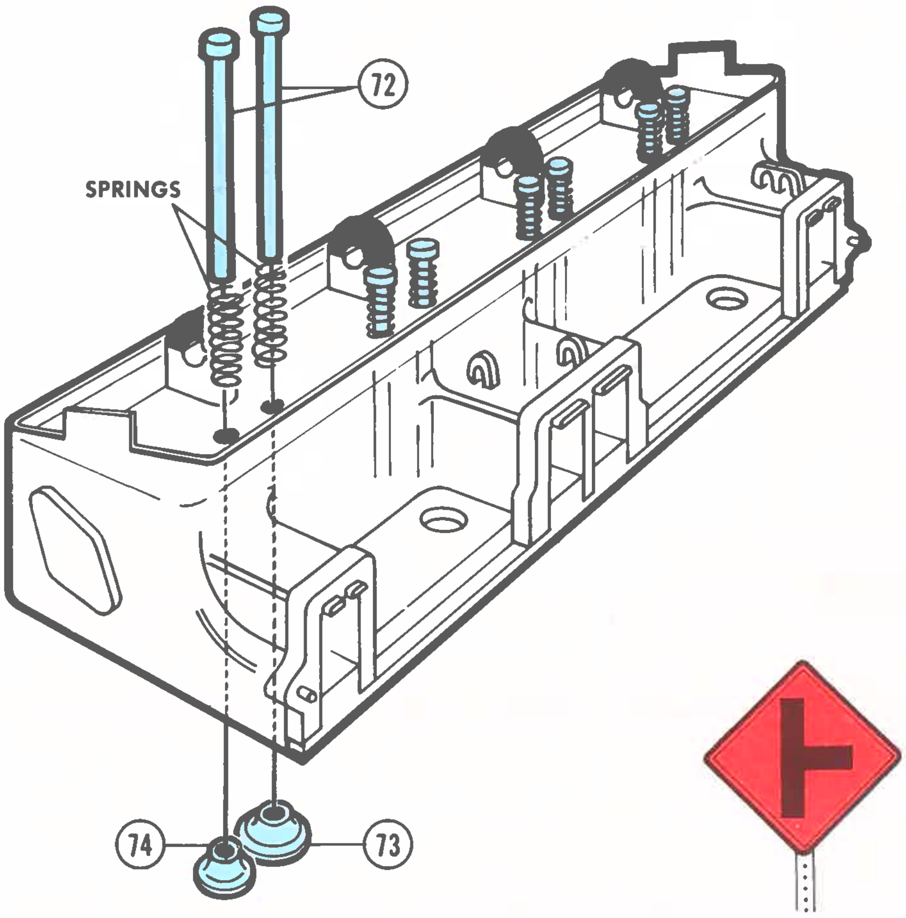


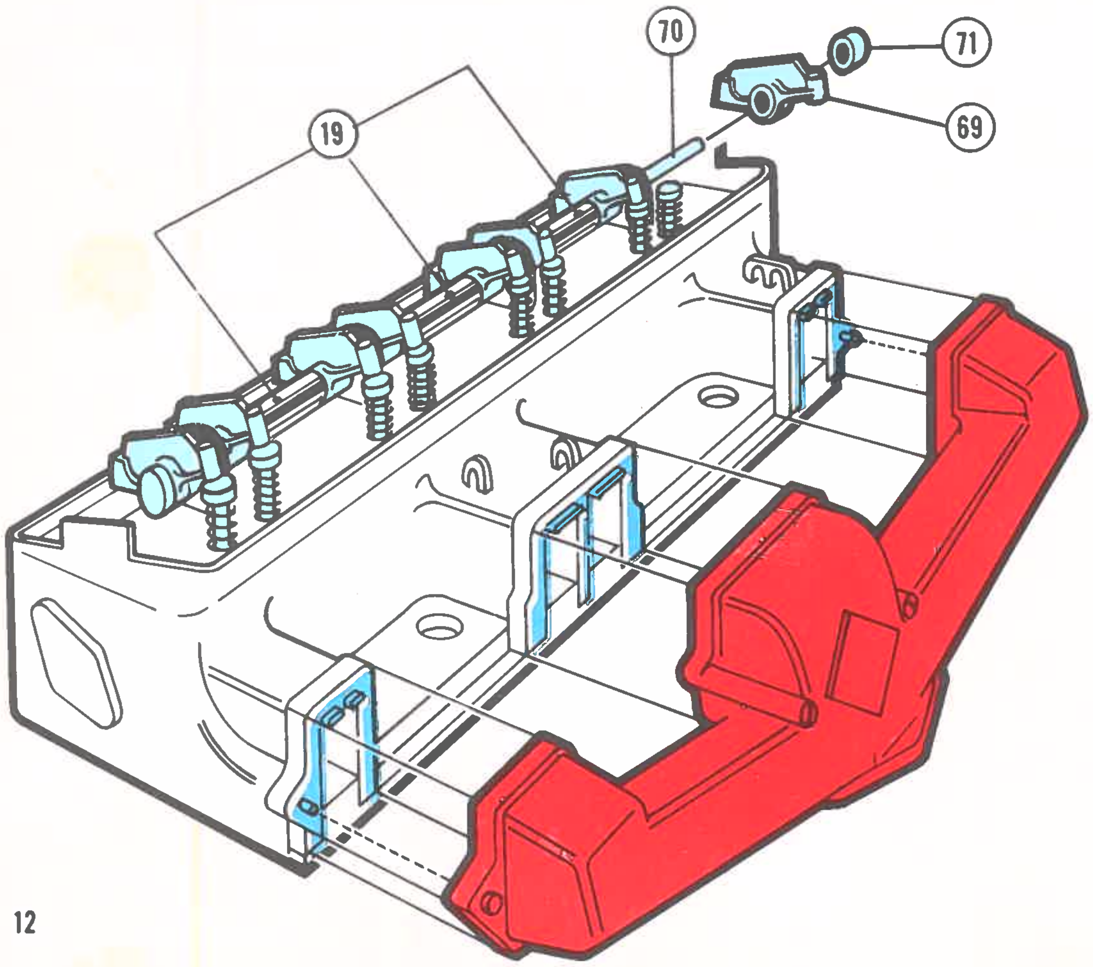
Apply cement as shown and assemble one of the Cylinder Head Bottoms (18) to the Left Cylinder Head (17) and the other Bottom to the Right Cylinder Head (16).

Cement four Rocker Shaft Bearings (118) to each Cylinder Head.



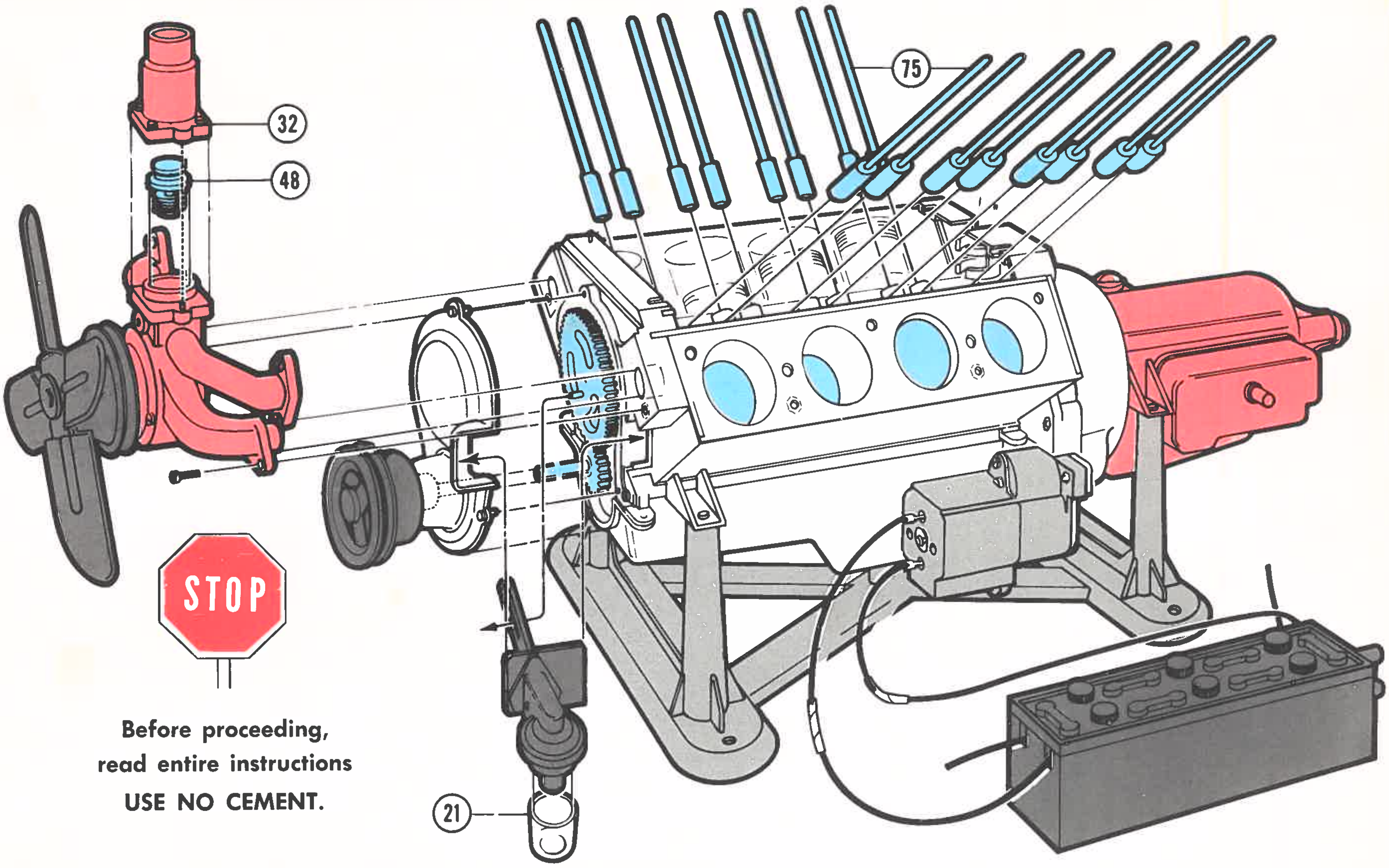
Find 8 Intake Valves (73) which are larger than the 8 Exhaust Valves (74) and note that each pair of Valve seats on the Cylinder Head Bottoms are also different in size. Find 16 Valve Stems (72) and 16 Valve Springs and proceed as follows:
Insert the end of the Valve Stem through the Valve Spring and through the Cylinder Head compressing the Spring so that the end of the Stem protrudes from the hole in the Valve seat. Determine the proper size Valve in accordance with the Valve seat and, after applying a drop of cement to the pocket in the Valve, assemble it to the Valve Stem, holding it until cement sets sufficiently to overcome the force of the Spring.





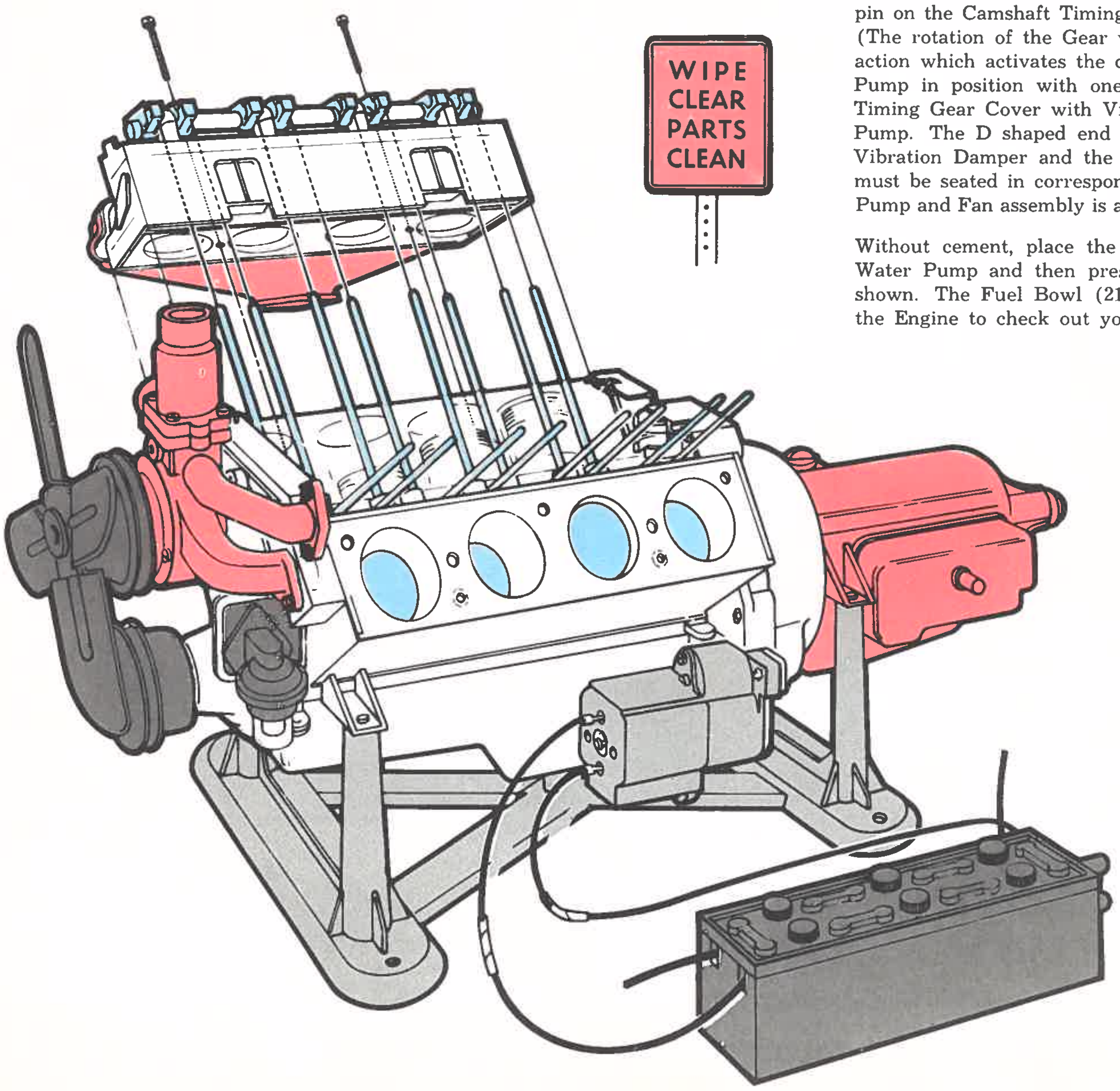
Find 16 Rocker Arms (69) and note that one end is circular and the other is squared. When assembling Rocker Arms on Rocker Shafts (70), it is necessary to assemble the Arms so that the circular end rides on the head of the Valve Stem. Start the assembly by inserting the Rocker Arm Shaft through a Rocker Arm with circular end toward you. Insert end of Shaft through first bearing of the Left Cylinder Head. Hold second Rocker Arm in position and thread the Shaft through its hole. Hold one of the 6 Rocker Spacer Sleeves (19) in position and thread Shaft through. Continue this procedure until 8 Arms and 3 Spacers are in place as per drawing and then press one of the Rocker Shaft Retainers (71) onto the end of the Shaft. Identify and check the fit of the previously assembled Exhaust Manifold Left. Apply cement carefully as shown and assemble to Cylinder Head. Set aside and repeat the procedure for Right Cylinder Head.

27 push rods



STOP

**Before proceeding,
read entire instructions
USE NO CEMENT.**



WIPE CLEAR PARTS CLEAN

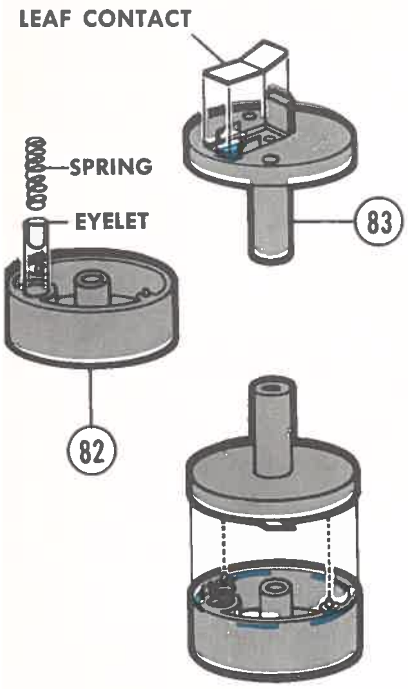
Position the previously assembled Fuel Pump as shown making sure that the pin on the Camshaft Timing Gear is in the slot of Fuel Pump Rocker Arm. (The rotation of the Gear will move the Arm up and down simulating the action which activates the diaphragm of a real Fuel Pump). Hold the Fuel Pump in position with one hand, and with the other hand, assemble the Timing Gear Cover with Vibration Damper to the Block trapping the Fuel Pump. The D shaped end of the Crankshaft must enter the sleeve of the Vibration Damper and the three locating studs on the Timing Gear Cover must be seated in corresponding holes in the Front Frame. Now the Water Pump and Fan assembly is attached by two ¼" screws, thus securing all parts.

Without cement, place the Thermostat (48) in the opening at the top of Water Pump and then press fit the Thermostat Housing (32) in place as shown. The Fuel Bowl (21) is now pressed into the Fuel Pump. Operate the Engine to check out your work.

Find 16 Push Rods (75) and remove all flash and irregularities in the plastic to insure smooth functioning. Insert 8 Push Rods into the guides on the Right Cylinder Block so that the bottom of the Rods rests on the Cams. The upper ends of the Rods are inserted into the holes in the bottom of the Right Cylinder Head and the Head is then worked down until it seats on the Block where it is fastened with two ½" screws. The upper ends of the Push Rods should emerge from the holes in the top of the Head and press upward against the Rocker Arms. Test run your engine to check your work. Repeat the procedure on the left side.

DO NOT FORCE

28 distributor



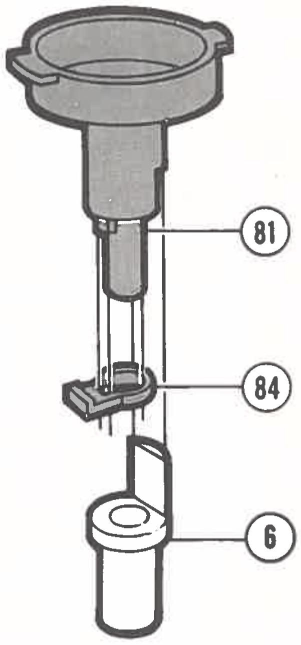
Find the Rotor Top (82) and the Rotor Bottom (83). Remove all flash and check the fit of the locating pins. Place a thin layer of cement in the shallower rectangular recess of the Rotor Bottom and position the Distributor Leaf Contact as shown. (The Leaf is a small steel piece bent at an approximate angle of 45°).

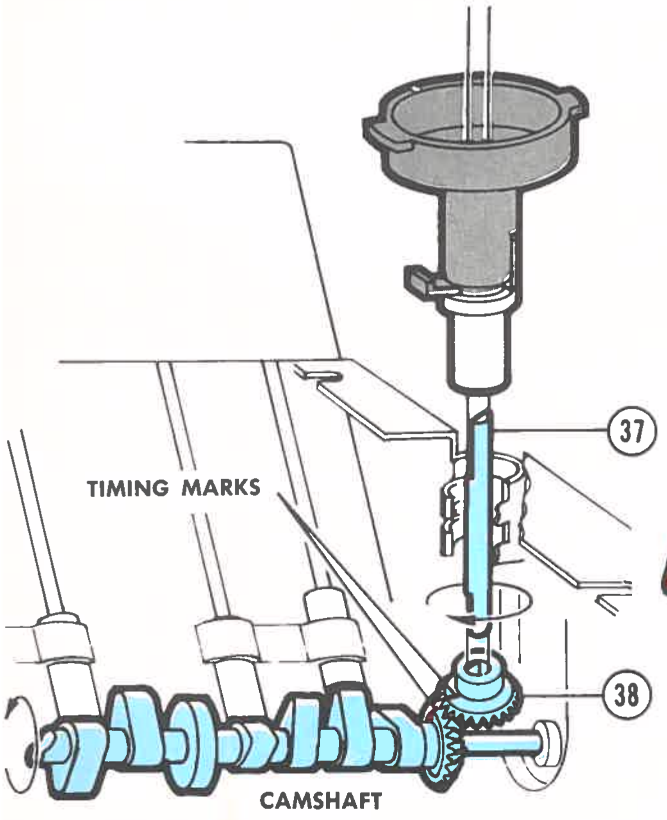
Remove any cement from the contacting surface of the Leaf since cement will act as an insulator and spoil the electrical circuit.

Drop the Distributor Eyelet into the hole along the edge of the Rotor Top and make sure that it can move freely and protrude through the wall and yet be retained by its flange. Insert the Distributor Spring into the same hole on top of the Eyelet.

Apply cement sparingly to the rim of the Rotor Top and then position the Rotor Bottom over it so that the Spring will rest against the flat of the Leaf Contact. Press the parts together so that locating studs enter holes and hold until cement sets. The closed end of the Eyelet should protrude from the top of the Rotor and should move easily with a spring-back action. The angled portion of the Leaf Contact will be visible in the center hole of the Rotor Top. Make sure that the outside of the Rotor is perfectly smooth so that it will rotate freely inside the Distributor.

Cement the Distributor Lock Washer (84) to the Distributor Bottom (81) and then assemble the Distributor Support (6) so that its tab fits against the flat surface of the Distributor Bottom. Set aside.





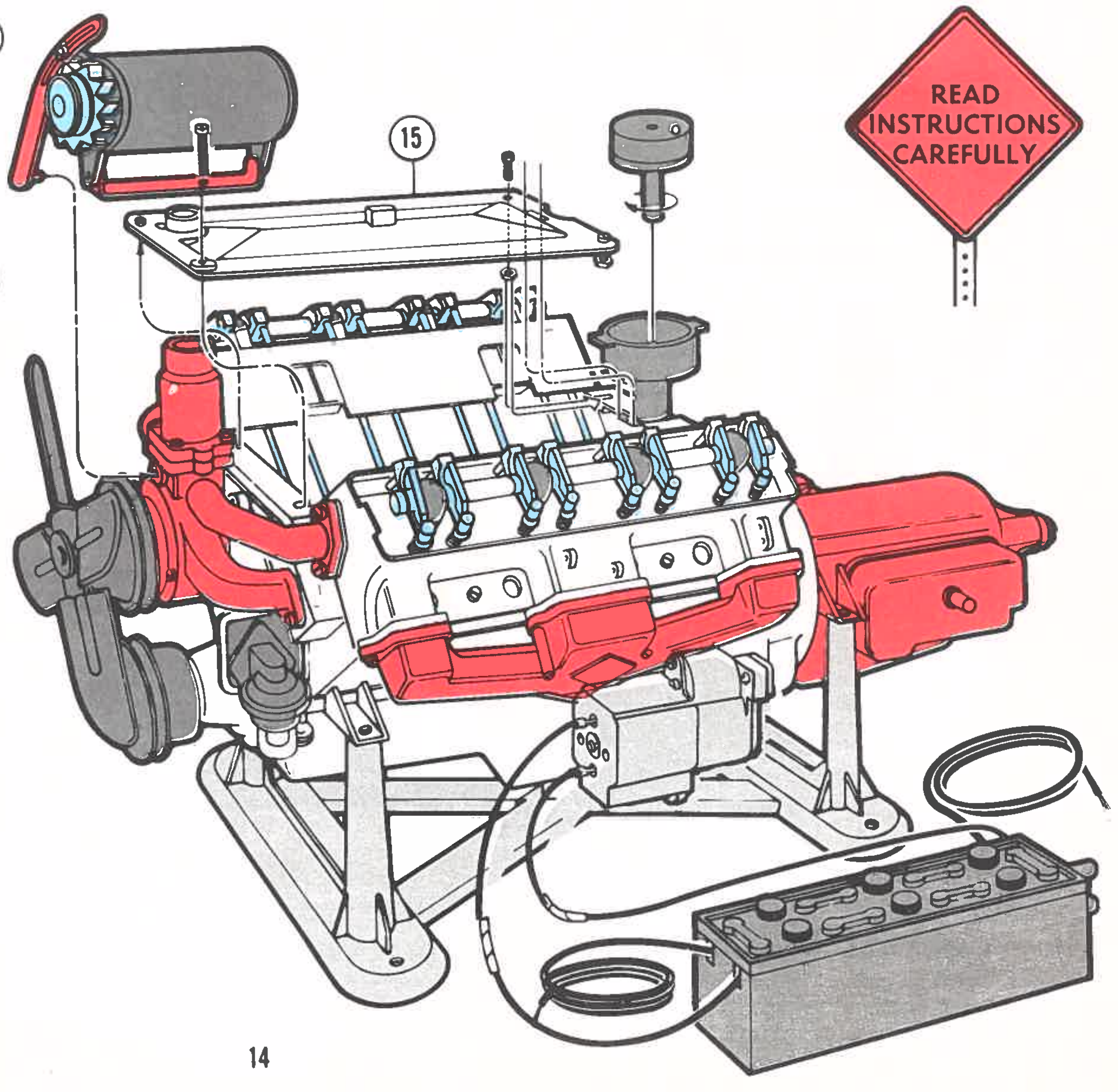
Find the Distributor Gear (38) and make the timing mark more visible with paint, india ink, etc.

Cement the shorter D shaped end of the Distributor Shaft (37) to the Distributor Gear, making sure that the collar of the Gear seats against the stop and that the end of the Shaft is about flush with the bottom of the Gear. Engage the Distributor Gear and Camshaft Gear as shown, making sure that the timing marks are aligned. Then position the Distributor Bottom in place with the tab of the Lock Washer toward the front.

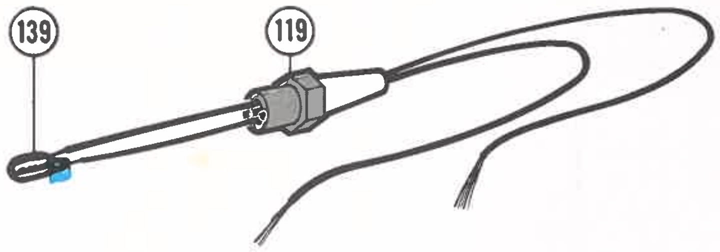
Find the Block Cover (15) and in the rear holes insert two ¼" screws and turn on two nuts until the bottoms of the screws are flush with the bottom of the nuts, leaving about ⅛" of thread between the top of the nut and the underside of the Cover. Position the Cover in place by sliding the nuts into the pockets of the Rear Frame and the tab of the Distributor Lock Washer into the slot provided. Tighten the screws after making sure that the locating stud on the Front Frame is in the hole under the simulated screw head at the right-front of the Cover.

Now fasten the Generator to the Block Cover with a ½" screw. Without cement, locate the stud on the free end of the Tension Rod into the hole provided in the Water Pump. The Fan Belt (a special type rubber band) is slipped over the Fan and into the V grooves of the Fan Pulley, the Vibration Damper Pulley and the Generator Pulley. The tension of the Fan Belt can be adjusted by loosening the screw holding the Tension Rod and retightening at any position desired.

Now fit the Rotor onto the D shaped Distributor Shaft inside the Distributor Bottom. Operate the Engine and note that the Rotor should rotate, being driven by the engaged Bevel Gears.

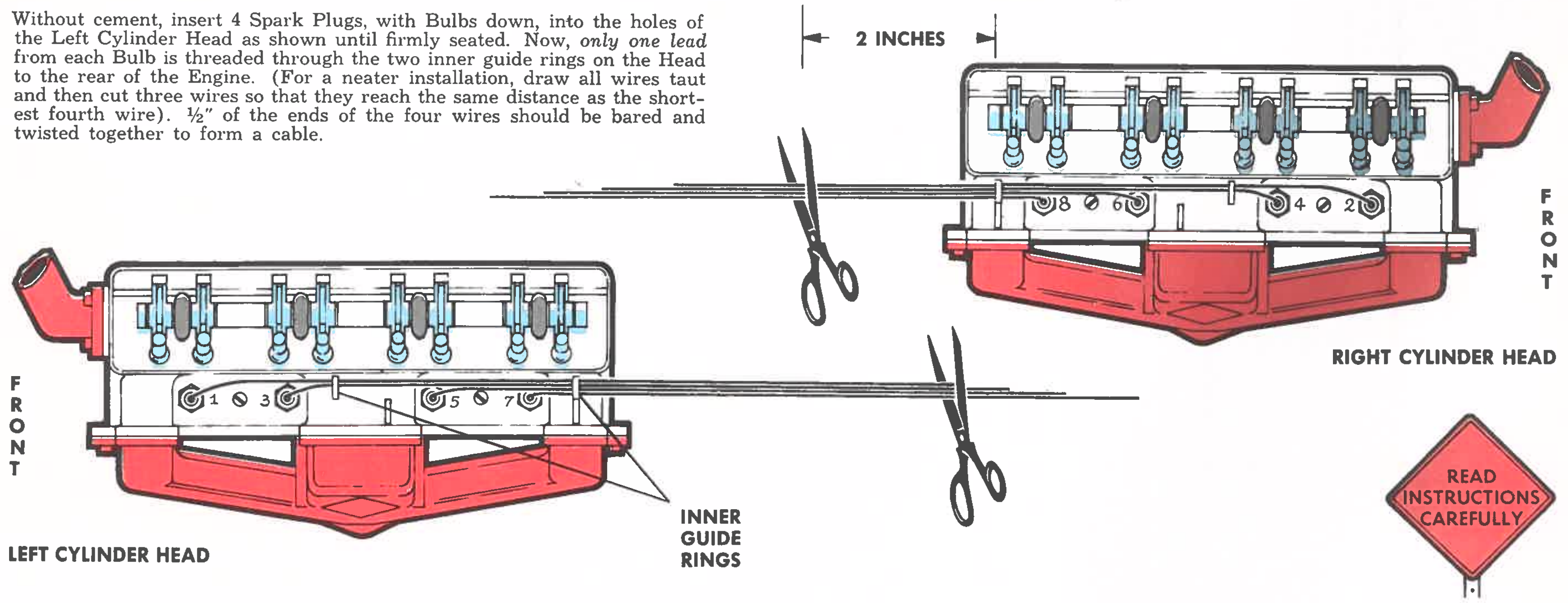


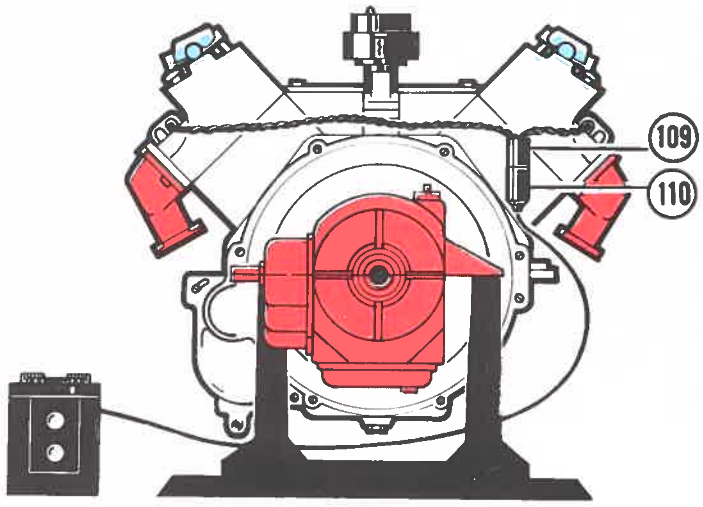
29 spark plugs



Find 8 Spark Plugs (119). (For additional realism, paint the upper half white and allow to dry before proceeding).
Thread the two leads of each Bulb (139) through the hole in each Spark Plug and before seating Bulb in Plug, apply a drop of cement as shown.

Without cement, insert 4 Spark Plugs, with Bulbs down, into the holes of the Left Cylinder Head as shown until firmly seated. Now, *only one lead* from each Bulb is threaded through the two inner guide rings on the Head to the rear of the Engine. (For a neater installation, draw all wires taut and then cut three wires so that they reach the same distance as the shortest fourth wire). ½" of the ends of the four wires should be bared and twisted together to form a cable.

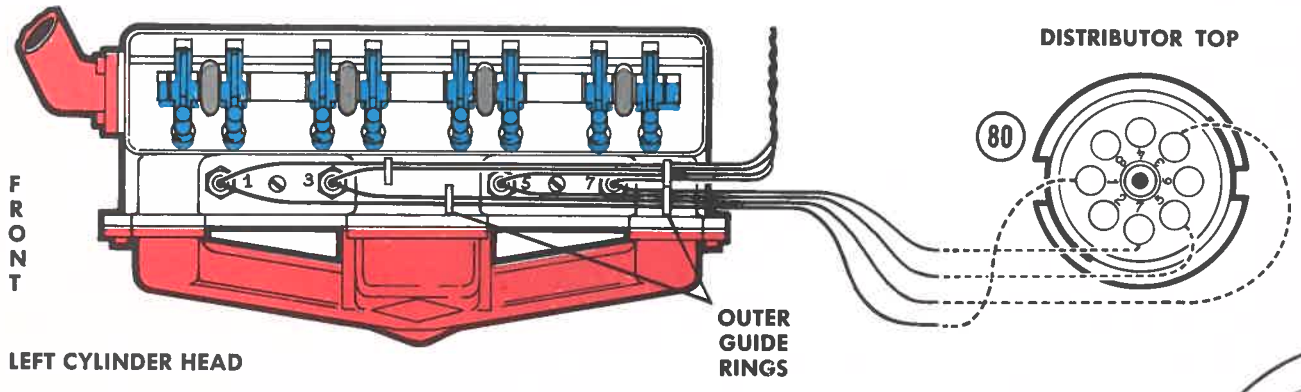


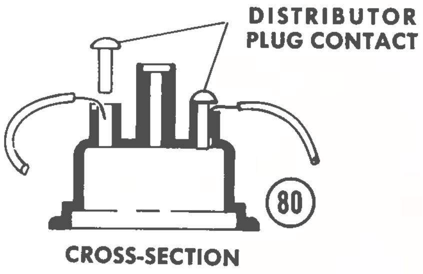


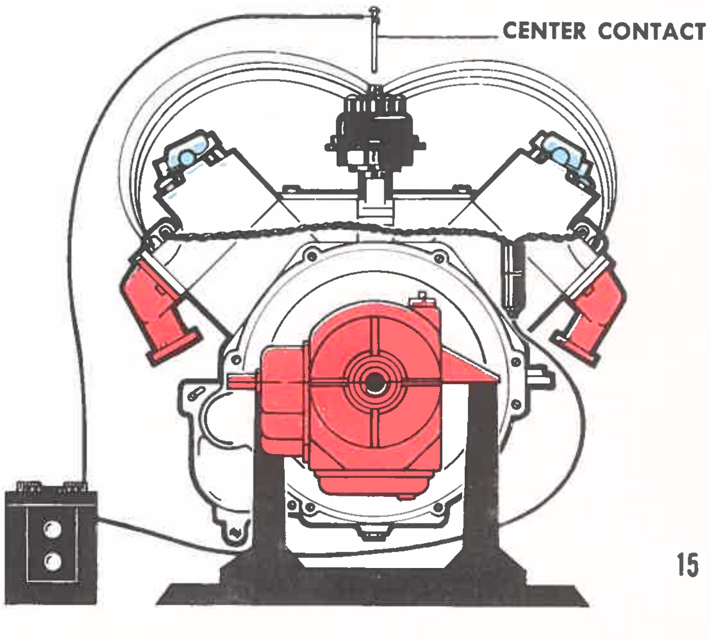
On the right side, the same procedure is followed *except* that all four wires are cut so that they extend 2" beyond the rear guide ring of the Head.

Twist the four wires to form a cable. Now twist the bare ends of right and left cables neatly together and insert through the hole of the Coil Top (109) as per drawing. The long lead from the Battery Switch is now brought over the Base to the right side of the Engine and is threaded through the Coil Bottom (110) as shown. Allow the Coil Bottom to slide down the wire (out of your way) while you splice it with the wires coming from the Coil Top. Slide the Coil Bottom back up the wire and assemble it to the Top without cement, thus covering the splice. The T shaped tab is then seated in the bracket without cement from above.

Find the Distributor Top (80) and note that Spark Plug terminals are numbered in accordance with the "timing" diagram. As a convenient reference point, the #1 terminal is marked on the exterior. Thread the remaining leads from Spark Plugs Nos. 1, 3, 5 and 7 through the outer guide rings on the left Cylinder Head. (For neater appearance, draw all four wires taut and cut the wires so that they reach the same distance as the shortest wire). The bared wire should be about ⅜" long.







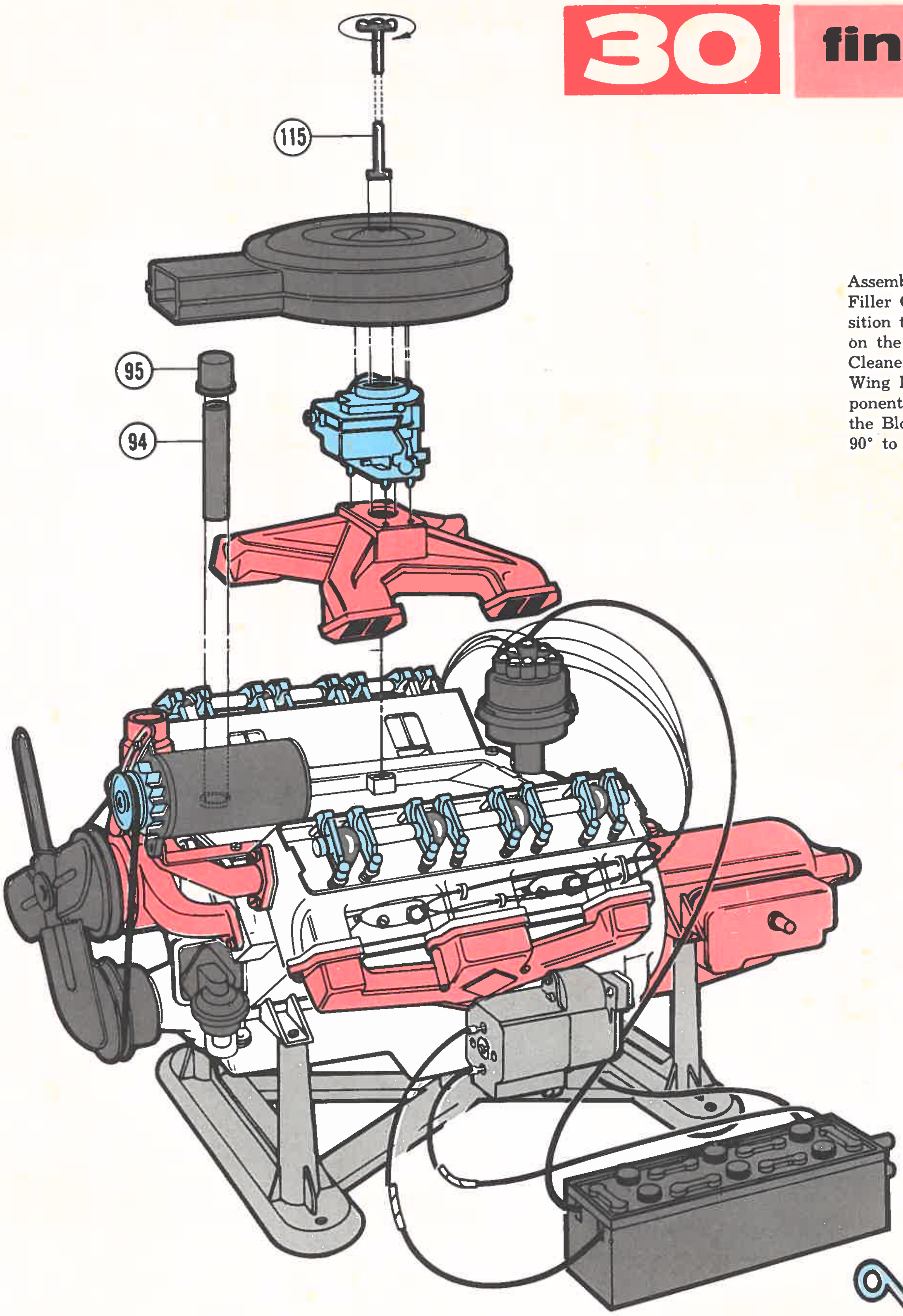
Insert the bared end of the wire from the No. 1 Plug into the proper terminal on the Distributor Top and then force one of the Distributor Plug Contacts into the hole. Make sure that the wire lies in the notch provided and that the head of the Contact is firmly seated on the plastic (not on the wire). The bottom end of the Contact should be *at least flush* with the inside surface of the Distributor Top (it may protrude slightly) in order that the Eyelet of the Rotor can make good electrical contact. In the same manner, connect Plugs Nos. 3, 5 and 7, and then repeat the procedure for the right bank with Plugs Nos. 2, 4, 6 and 8. If any of the wire has come through to the inside of the Distributor Top, it must be moved out of the way so that it will not interfere with the Rotor Contact or any other metal parts.

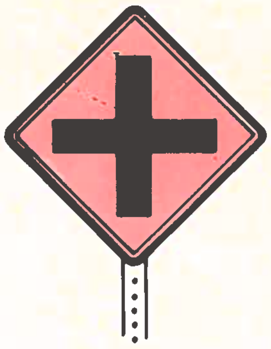
If Plug Contacts protrude too far beyond the inside surface of the Distributor Top, Rotor Eyclet may bind. Push back until *flush*.

Now the remaining lead from the Battery Case is twisted under the head of the Distributor Center Contact which is then fully inserted into the center hole. Before mounting the Distributor Top, check the alignment of the "timing" marks on the Bevel Gears. Realign if necessary by rotating the Distributor Bevel Gear via the Rotor or the Shaft. Note that the locking ears of the Distributor Top are unequal in size. Find proper location and twist-lock the Distributor Top onto the Distributor Bottom. Test out your work by pressing both Switch Buttons. Each Spark Plug should "fire" when the Piston is at the top of its "compression" stroke.

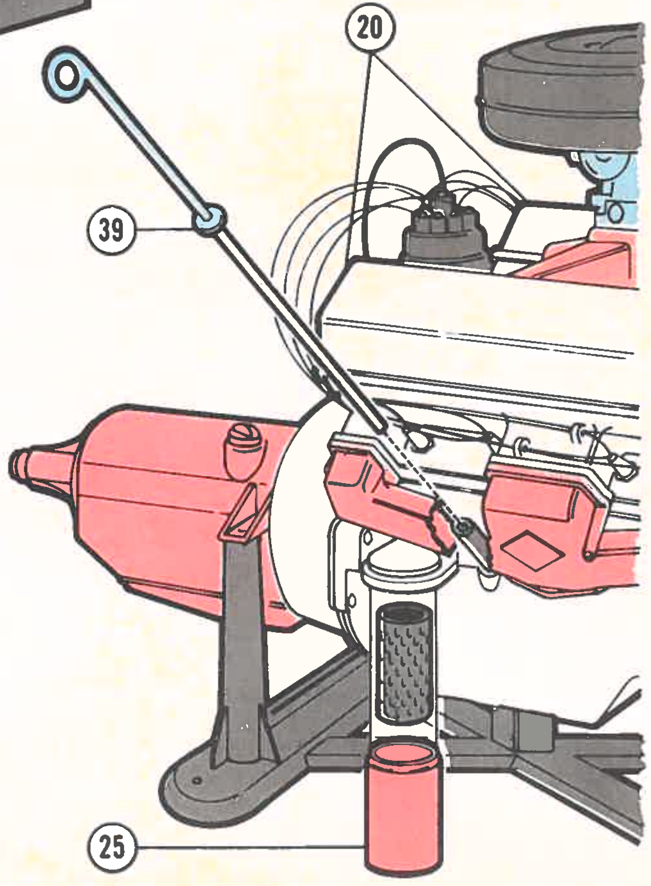
30 final assembly

Assemble the Oil Filler Pipe (94) and the Oil Filler Cap (95) as shown. Without cement, position the previously assembled Intake Manifold on the Block and then the Carburetor and Air Cleaner as shown. Insert the smaller end of the Wing Nut and Shaft (115) through these components until it comes through the underside of the Block Cover. Turn the Wing Nut clockwise 90° to tighten.





On the right side of the Engine, place previously assembled Oil Filter into the Oil Filter Can (25) and attach to Frame as shown. Insert the Oil Stick (39) into the Oil Stick Sleeve. Without cement, position the two Valve Covers (20) as shown. Your Visible V-8 is now completed.



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